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THE PROBLEM OF ABDOMINAL PAIN

WITH SPECIAL REFERENCE TO THE LOCALIZATION OF VISCERAL PAIN

BY

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What is the problem? Why have so many theories been formulated? Morley (1931) has put the matter succinctly:

> "The need for a theory of abdominal pain arose from the discovery that the gastro-intestinal tract and the other intraperitoneal organs, when exposed to direct mechanical, chemical, or thermal stimulation, are incapable of producing painful sensations. This fact, when once realized, had to be reconciled with the universal experience that pain does result from various inflammatory or obstructive disorders of these organs. A further and more obvious difficulty was found in the peculiar distribution of the pain in many abdominal diseases. Sometimes it would be central, sometimes unilateral. In some cases it would be felt chiefly in the back, and occasionally it was most marked in so remote a region as the supra-acromial area of the shoulder. An explanation had to be found for this peculiar radiation of pain to regions more or less remote from the causal lesion. Further, in certain disorders of the abdominal viscera, it was found that the pain is associated with localized areas of tenderness on pressure, cutaneous hyperalgesia, and muscular rigidity, all in the abdominal wall, while in other and equally painful disorders these superficial manifestations are absent. A theory had to be elaborated that would explain all these highly confusing manifestations of abdominal pain."

In the present somewhat discursive paper there will be found much that is old and true, a good deal that is more recent, mainly speculative, but of great interest, and a little that is new. It is my hope that in the "new" something of interest may be found and perhaps even a grain or two of truth.

"Where do you feel the pain?" The purist may reply, "In my sensorium," but the ordinary patient clearly understands one's meaning, and will indicate, more or less exactly, where his pain is situated.

Before approaching the problem of abdominal pain it is of course essential to have a clear conception of the development, anatomy, and physiology of the tissues concerned, as well as of the morbid and pathological conditions which may excite the sensation of pain. Especially must we know the peculiar nerve pathways present and to what particular stimuli they respond. We know that each special sensory apparatus or system is so made or modified that it responds only to its own peculiar stimulus. Thus the visual apparatus responds only to light, the auditory system only to sound, and so on. The stimulus must be "adequate"—i.e., of the right kind and of sufficient strength—before it reaches the threshold of consciousness: there it is analysed and registered.

Visceral Pain

The abdominal viscera have no cerebrospinal (somatic) nerve supply, their innervation being by autonomic nerves only. That is why we can cut, pinch, or burn the intestine without producing pain. Why, then, does true visceral pain occur? Hurst (1911) has proved that increased tension in the muscular wall of the gut is the appropriate stimulus for the production of this pain. The cause of this increased tension is hyperperistalsis such as occurs in biliary colic, intestinal obstruction, the pains of labour, and acute appendicular obstruction. In these conditions the exaggerated contractions—and the resulting pains—are intermittent. When the contraction is more prolonged, as in spasm of the stomach, the pain is more continuous—e.g., hunger pain of duodenal ulcer. Whether the pain impulse is excited by pressure on the afferent nerve endings or by ischaemia or by liberation of the pain-producing substance we do not know. Musser (1904), Nothnagel (1905), and Neumann (1910) all recognized that increased tension in the gut could cause visceral pain, but it was Hurst who proved conclusively that this is the only mechanism. It is often said that distension can cause visceral pain. It generally does, since distension stimulates contraction, but it is well known that in paralytic ileus and in the terminal stage of unrelieved intestinal obstruction no peristaltic action occurs. When the bowel, from fatigue, gives up the struggle, peristalsis and pain cease—"the silent abdomen"—but increasing distension goes on until the inevitable end. A similar sequence of events takes place in the atonic and over-distended urinary bladder. Thus, before visceral pain can occur, distension must be overcome or at least be resisted by active muscular contraction.

Morley (1931) has given us, chiefly through his observations and experiments on "shoulder-tip pain," his theory of peritoneo-cutaneous radiation and peritoneo-muscular reflex. This theory is an attractive one and of the greatest practical help as a working hypothesis. It has to a great extent supplanted Mackenzie's theory of a viscero-cutaneous reflex and a viscero-motor reflex. Mackenzie rejected Ross's splanchnic pain entirely, and explained all visceral pain as referred by a system of "reflexes" through the splanchnic afferent nerves to the cerebrospinal nerves of the abdominal parietes. With the aid of local and spinal anaesthetics it is now easy to prove Mackenzie's theory wrong and to show that Morley's conviction is right.

Morley writes: "I am convinced that true visceral pain exists . . . it is in no sense referred to the superficial structures of the abdominal wall, and is a deep-seated central pain, not accurately localized."

Some years ago an old and very thin woman was admitted to Dundee Royal Infirmary under my care with a diagnosis of acute obstruction due to a strangulated umbilical hernia. There was no doubt about the acute obstruction—complete constipation, vomiting, distension of the abdomen, and intermittent attacks of severe visceral pain in the umbilical region all occurring. On examination we found a large umbilical hernia, the diameter of the hernial opening being about 3 inches, but there was neither obstruction nor strangulation at this site, the hernial protrusion being very easily reducible. It was interesting and instructive to see and feel through the very thin coverings of the hernia successive waves of hyperperistalsis of the small intestine—each wave of tetanic contraction exactly coinciding with a bout of severe central pain. As each wave of peristalsis subsided so did the umbilical pain. No hyperaesthesia or hyperalgesia or muscular rigidity was found in the abdominal wall. Further examination revealed the presence of a small right-sided femoral hernia, of which the patient was completely unaware since it was producing no local spontaneous pain. Pressure on the femoral hernia elicited pain. This is an observation that is not always fully appreciated—i.e., that local tenderness, in somatic tissues, can be found, and should be sought for, before the onset of spontaneous pain: the simple

explanation being, of course, that pressure increases the pain-producing stimulus. I then, for the benefit of a confirmed "Mackenzieite," completely anaesthetized the skin and abdominal parietes in front of and for a considerable area around the umbilical hernia. This, as I anticipated, had no appreciable effect on the frequency or intensity of the visceral pain, thus proving—if further proof be necessary—that visceral pain is not referred to and "felt" in the abdominal parietes. At operation a small loop of strangulated small intestine was found in the femoral hernia sac as well as a little blood-stained fluid, the latter being a chemical rather than a physical irritant to the parietal peritoneum.

Practically all observations and experiments on visceral pain have been made on an anatomical and/or physiological basis in the fully developed subject, generally with due consideration of morbid and pathological states and operation findings. For a true understanding of this "deep-seated central pain" we must go far deeper. We must seek the help of embryology and morphology; we must go back to the study of the embryo before anatomical structure was completed or physiological functions were established, and follow its development step by step.

Figs. 1a, 1b, 2, 3, and 4 show diagrammatically various stages in the development of the gastro-intestinal tract in the human embryo. Figs. 1a and 1b show the alimentary tract as a simple straight tube, slung by a dorsal mesentery, lying in the midline of the body; nerve supply from fifth to twelfth thoracic ganglia through the three splanchnic nerves—a bilateral innervation from the autonomic nervous system. The gut has, in the abdomen, no somatic nerve supply. This is what one might term the original position of the intestine, and it is of the greatest importance for our consideration and understanding of the localization of visceral pain to keep this primary relative position ever in mind. It is clear from Fig. 1a that the stomach and the duodenum, with its diverticulum the gall-bladder, lie in the epigastrium, the small intestine and appendix occupy the umbilical region, and the colon is situated in the hypogastrium. If these organs permanently occupied these respective positions we should naturally expect visceral pain produced in the stomach, duodenum, and gall-bladder to be situated in the epigastrium, and likewise small-intestine colic and appendicular colic to be localized in the umbilical region, and colon pain in the hypogastrium—exactly in the positions that clinical experience has taught us these pains are localized after full development of the intestine. (See Fig. 5.)

But the intestine does not remain a short straight tube: it elongates enormously, rotates, herniates into the umbilical cord, returns to the abdomen, and continues to lengthen. Finally it assumes its permanent position as shown in Fig. 4.

What happens to its nerve supply during this period of elongation, rotation, and migration? The nerves lengthen too, of course, but they are still the original nerves, and no new nerve supply is acquired by the intestine during its growth and migration. And what of sensation? Nature has wisely decreed that the less we know, in health, about our "insides" the better, and so the intestine and peritoneum have neither tactile nor positional sensation. Nor have we any subjective knowledge of normal physiological processes, such as digestion and normal intestinal peristalsis. Life would be very unpleasant—indeed impossible—if we were continually conscious of our liver, hobnailed or smooth, rubbing up and down against our parietal peritoneum, or if we were aware of normal peristaltic action. For a similar reason the cornea has no tactile sensitivity. Yet it is common experience that certain abdominal diseases and disorders do give rise to pain, often of an intense character, and thus we are warned of impending danger—danger which may threaten health or life itself.

What conditions in a hollow tube are likely to endanger health or life? The presence of a harmful irritant or of something which may obstruct the lumen of the tube: one must be got rid of and the other overcome as soon as possible. For

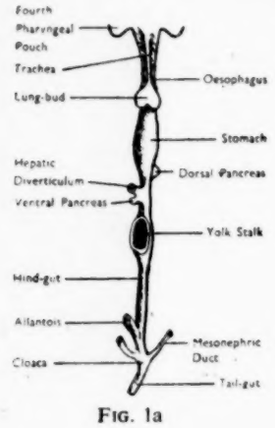

FIG. 1a

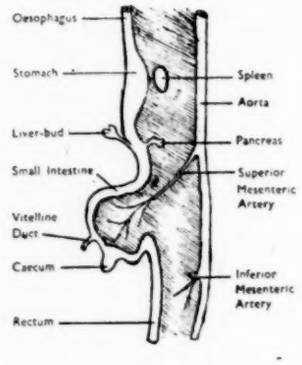

FIG. 1b

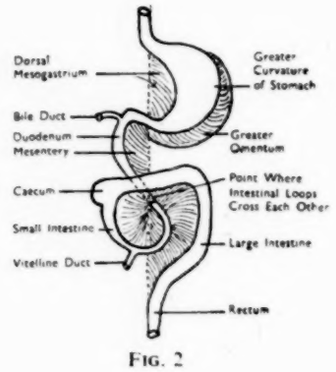

FIG. 2

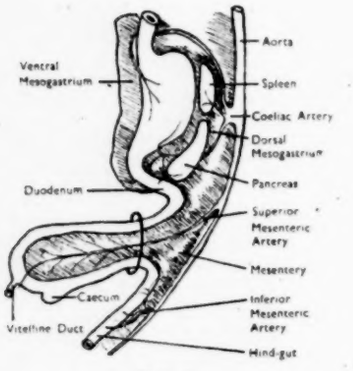

FIG. 3

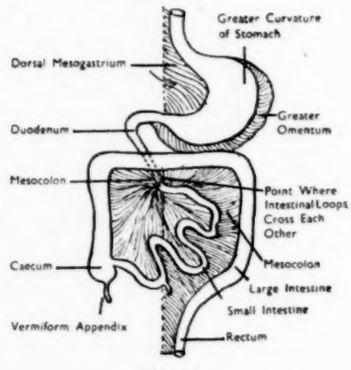

FIG. 4

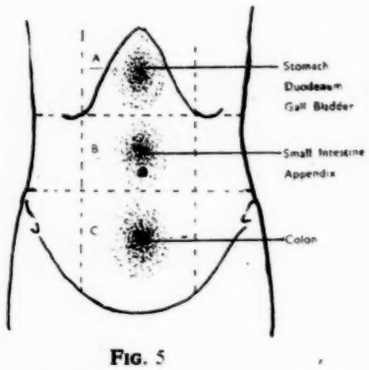

FIG. 5

FIG. 1a.—Showing alimentary tract in ventral view, a simple straight tube, at 4 weeks. Compare with Fig. 5.
FIG. 1b.—Alimentary tract at 5 weeks, viewed from left side. Shows dorsal mesentery and formation of loop—caecum indicated.
FIG. 2.—Rotation of intestinal loop round the superior mesenteric artery—caecum undescended. 6 weeks.
FIG. 3.—Herniation of intestinal loops into cord. 7 weeks. Rotation not shown.
FIG. 4.—The final disposition of the intestines. 10 weeks.
FIG. 5.—Showing the localization of true visceral pain produced in the intestine. Compare with Fig. 1a. A, Epigastric region; B, Umbilical region; C, Hypogastric region.

that purpose peristaltic contractions become more powerful than normal, and if needs are desperate the muscle wall can quickly hypertrophy so that greater and greater force may be exerted. In case of necessity peristaltic action can even go into "reverse gear." When this hyperperistalsis occurs, then—as I have already described—the sensation of pain (visceral pain) is produced.

Where Visceral Pain is felt

Where will the pain be "felt"? Always, if the nerve afferents are purely autonomic, in the primary relative position of the affected organ. If we must have a word to describe this peculiar localization of visceral pain I suggest the term "retrojection" (to coin a word) but no reflex action is involved. We know that sight is *projected*, and that surgeons daily project touch by means of a probe. Growth and migration of the gut and its nerves have made no difference to sensation or sensitivity, and therefore pain produced, say, in the appendix—no matter where it lies—will be "felt" in the umbilical region, biliary colic will be "felt" in the epigastrium although the gall-bladder has migrated to the right hypochondrium, and so on. Thus we should know fairly accurately, by the position of the pain (visceral), which organ is affected. Incidentally, it cannot be too strongly emphasized that the most important question one can ask a patient suffering from abdominal pain is this: "*Where* did the pain *first begin*?" The answer to this question will in many cases indicate which organ is affected, and so will enable us to differentiate clearly such conditions as acute cholecystitis (early visceral pain in the epigastrium), acute appendicular obstruction (visceral pain in the umbilical region), renal colic (pain in the lumbar region—always unilateral, never central), rupture of a Fallopian-tube pregnancy (primary pain is "somatic" and always begins low in one or other side of the pelvis). Pain produced in a bilateral organ is always unilateral, because the nerve supply is unilateral.

And suppose the bowel perforates? We may not be able to tell which particular segment of the gut is affected, but the parietal peritoneum will soon indicate where to look for the trouble, and in time experience should enable us to make more and more accurate diagnoses. The parietal peritoneum is exquisitely sensitive to such irritants as inflammatory and infective exudates, bowel contents, extravasated bile, and even sterile blood. Such irritants stimulate the somatic pain-conducting afferents of the parietal peritoneum and abdominal parietes; and, clinically, local tenderness and muscular rigidity, and local pain, indicate when and where these irritants are present.

How, it may be asked, can the peritoneum, with neither tactile nor positional sense, give us this valuable information? The *parietal* peritoneum, or rather its inner serous surface, is endowed with a special sense, and one only—namely, sensitivity to a chemical stimulus (again like the cornea)—and thus the pain impulse is excited by the presence of any foreign chemical substance in contact with it.

Many of those interested in and puzzled by this problem have attempted by countless observations and ingenious experiments to find a satisfactory solution. Many theories have been formulated and propounded. They speak of visceral pain as being "radiated" or "referred," "reflected," "transferred," "deflected," etc., by means of what they call "reflexes" from the affected viscus to some distant tissue. May I remind them of this: where a particular sensation is essential for the welfare and survival of the organism it will be provided; if it is unnecessary or undesirable it will not be provided.

My view is that the completely developed intestine, long and rotated though it be, and however far parts of it have migrated, is still essentially a midline organ; its nerve supply is that of a short straight tube; its sensitivity is still that of a short straight tube situated in the middle of the abdomen; and it naturally and inevitably follows that pain produced in a part of that tube, whether short or long, twisted or straight, will be localized in the primary relative position of the affected part. (Figs. 1 and 5.)

Aristotle's Experiment

Let us now consider Aristotle's well-known experiment and see what significance it bears on the subject.

In his *Problemata* Aristotle (384-322 B.C.) asks this question: "Why is it that an object which is held between two crossed fingers appears to be two? Is it because we touch it at two sentient points? For when we hold the hand in its natural position we cannot touch an object with the outer sides of the two fingers." From three separate sources I find that the *Problemata* of Aristotle in which the experiment is mentioned is not, strictly speaking, Aristotle's own work. It was the compilation of several hands, and belongs to the time after the Christian era—perhaps the fifth century. It would seem that nothing more than the question was asked, and no answer, except surmises, was given; and, besides, it may not possibly have been posited by Aristotle but by some later writer. It is clear that Aristotle knew nothing of the functions of the nerves and nervous system and so could not answer his question. However, for our purpose, that matters little. What does matter is the significance of this simple experiment quoted from *Starling's Principles of Human Physiology* (1941):

> "If with the eyes shut we cross the first and middle fingers and bring them in this position in contact with a pea, we should at once say that two peas lay under the fingers. This is especially marked if the pea be rolled between the fingers. The two sides of the fingers which come in contact with the pea usually touch two different objects, and these parts of the skin would have to be re-educated—i.e., their local sign would have to be changed in accordance with the changed conditions—before the pea would be perceived in its true state as single."

I have repeated the experiment—other objects, such as the blunt end of a pencil, can be used instead of a pea—and of course found that the illusion, as such it is, does occur. The converse, as one would expect, also occurs—that is, two objects, one in contact with the now distal aspect of the index finger and the other in contact with the now distal aspect of the middle finger, are felt as one. I realized that the "two" objects in the original experiment were separated by a definite interval—two fingerbreadths: that was suggestive. Then, with eyes closed and forgetting that my fingers were crossed, I concentrated on the relative positions of the "two" objects (or points of contact) and found that the "object" in contact with my index finger undoubtedly lay—so far as my consciousness could discriminate—on the *radial* side of the "other object" in contact with the middle finger: in other words, I now believed my fingers were no longer crossed but were parallel—i.e., in their normal relation or primary relative positions. If pain is produced by pressure or by putting sharp projections on the object held between the crossed fingers the illusion becomes even more pronounced. I believe that the sensations of touch and pain produced in the crossed fingers are "retrojected" to the primary relative positions of the parts stimulated, and in my opinion this supplies the logical answer to the two-thousand-year-old question. Physiologists may say that the explanation is "the conditioned state of the cerebral cortex," but such an explanation could not apply to the localization of visceral pain, since we have neither consciousness nor memory of the position of our abdominal organs (unless impressions were registered very, very early in embryonic life?).

Tastevin (1937) writes: "The inversion of the sensations produced in two crossed fingers has been observed by several others, and, for the first time, by Czermak (1855), who at the same time drew attention to an analogous phenomenon in displacement of the lips." Tastevin, in an elaboration of Aristotle's experiment, found that these false localizations, or illusions, occur in any tissues mobile enough to be moved from their natural positions—e.g., the lips, the tongue, the fingers, the eyes, fractured limbs, etc. In a search of the literature I have found nothing to suggest that anyone has previously considered that the illusions produced by these experiments are similar to the illusion produced by pain excited in an organ which has been displaced from its primary relative position by normal processes of development and growth. It is my contention, and conviction, that the two conditions, artificial and developmental, are completely analogous, provided the migrated organ (or tissue) retains *only* its original afferent nerve supply. Thus, and thus only, can we explain the peculiar localization of visceral pain when situated at a distance from the affected organ. Here, indeed, is the key to the problem.

One suspects that some of those interested in this problem believe that if they knew "precisely" or "accurately" which tissues to anaesthetize in the painful area they could by induction of block anaesthesia prevent or abolish this so-called

" referred pain." They will never succeed: they might as well try to anaesthetize the original position of the foot of the amputee who complains of pain in his lost foot—always, be it noted, at a leg's length from the trunk.

The small child suffering from a slight attack of appendicular colic has no doubt about the locality of his pain. When asked, " Where is the pain?" he puts a finger in his umbilicus and replies, " In there." When the pain is more severe he places the whole hand over the umbilicus.

The Pain is Ill-defined.—This is a relative term, of course, but if one considers its mechanism it is just the type of pain one should expect. The common cause is a wave of hyperperistalsis in the bowel proximal to an irritant or obstruction. There is no abrupt transition from normal bowel to strongly contracting bowel: the action is wave-like (crescendo–diminuendo). Many patients describe their pain as " coming in waves." Who can tell where the wave begins or where the ripple ends?

Diaphragmatic Pain : Shoulder-tip Pain

Morley has emphasized the importance of shoulder-tip pain as a symptom in certain abdominal conditions. I have repeated his experiment under spinal anaesthesia, and can confirm the observation that even light irritation of the peritoneum covering the central portion of the diaphragm causes severe pain in the shoulder. A point of great interest and significance is that the conscious patient feels no pain or other sensation locally from the presence of the finger or swab in contact with his diaphragm.

Mainly from these experiments, Morley has formulated his theory of peritoneo-cutaneous radiation. He further states that if the shoulder-tip is rendered insensitive by injection of a local anaesthetic the pain is much less severe. He does not claim that the injection completely abolishes or prevents pain in the shoulder-tip when the under surface of the diaphragm is then stimulated, and writes:

> " That shoulder-tip pain was not abolished completely by the cutaneous anaesthesia may be attributed to the fact that the descending cervical nerves from the third and fourth segments supply sensory fibres to the acromio-clavicular joint as well as to the periosteum of the acromion process and clavicle. Since care was taken to make the subcutaneous injection as superficial as possible, these fibres would escape the action of the novocain, and this would probably account for such pain as persisted after the shoulder-tip area had been anaesthetized. It can be stated with the greatest confidence that none of the novocain solution was injected anywhere near the trunk of the phrenic nerve, so that a possible fallacy in the experiment—viz., anaesthesia of the phrenic nerve—need not be considered."

Is there no other explanation why the relief from pain was only partial and not complete? Did suggestion—auto- and hetero- —have any effect in relieving the pain? Did the local anaesthetic have any counter-irritant effect? Would complete anaesthesia of *all* the descending sensory nerves, including those to the clavicle, acromion, and acromio-clavicular joint, have entirely prevented this " peritoneo-cutaneous radiation "? Here it will suffice to say that in circumstances in which clinician and patient both expect a certain phenomenon to happen the more likely will their anticipation become realization.

My personal view is that when the central portion of the diaphragm is irritated shoulder-tip pain will occur (*a*) if all fibres of the descending cervical nerves mentioned are completely anaesthetized, and (*b*) if even a fore-quarter amputation were performed.

Here we have an organ—the central portion of the diaphragm —which has migrated from the neck, taking its original nerve supply (phrenic nerve from C 3, C 4, and C 5) with it to its secondary or permanent position, where it has not acquired a new or additional innervation. This is analogous to what happens in the intestinal tract: therefore pain produced in this migrated organ will be localized in the primary relative position of the diaphragm. Such, at any rate, is my belief. We must of course remember that the diaphragm has an upper, thoracic surface, as well as an abdominal surface, and that medical conditions such as pleurisy, pulmonary embolism, and pericarditis can also give rise to shoulder-tip pain.

Conclusion

I anticipate the question, " Why is testicular pain localized in the testis, a migrated organ? " The answer is that the local pain is due to irritation of the tunica vaginalis, which is derived from a process of *parietal* peritoneum and supplied by the genito-femoral nerve—a somatic nerve from L 1 and L 2. Both parietal and visceral tunicae are sensitive, and so provide a protective mechanism for the testis in its very exposed position. The testis itself has a sympathetic innervation from the tenth or eleventh and twelfth thoracic segments (authorities differ slightly) through the renal and aortic plexuses. These nerves accompany the testicular vessels. True testicular pain will, like ovarian pain, be felt in the loin, since both testis and ovary have migrated from this position. It is said that two types of pain occur in injury to the testis: slight trauma causing local pain, and more severe trauma producing pain in the loin—a very perfect protective arrangement.

Here then, I submit, we have a rule without exception—in other words, a *law*, which may be stated thus: *Pain produced in an organ which has migrated from its primary relative position, and which has not acquired an additional nerve supply in its secondary or permanent position, is invariably localized in the primary relative position of that organ.* This law may be amplified to include artificially displaced tissues and other sensations besides pain, thus: Sensations produced in tissues which have been developmentally or artificially displaced from their primary relative positions and which retain only their original innervation are invariably localized in the respective primary relative positions of those tissues.

Summary

The development of the intestinal tract is briefly described.

The sensitivity of the intestine and parietal peritoneum is discussed, also the adequate stimuli which produce visceral and somatic pain.

Aristotle's experiment is described and analysed.

The view is advanced that the " false localizations " which occur in this experiment and elaborations of it are analogous to the " retrojected " pains produced in organs which have migrated from their primary relative positions.

I am indebted to Dr. Janet Conn for the diagrams.

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The number of wartime nurseries established in Scotland for the young children of working mothers is growing steadily despite difficulties in securing suitable premises and building labour and equipment. Edinburgh now has seven nurseries in operation, Glasgow five, Aberdeen two, and Coatbridge, Falkirk, and Paisley one each. There is a keen demand for 63 other nurseries which were expected to be open throughout Scotland by the end of April or the beginning of May. One of the encouraging features of nursery development has been the rapidity with which staffing problems have been overcome. Many married women have volunteered as matrons, deputy matrons, and assistant nurses; Child Care Reserve courses are full; many applications for probationerships have been received from girls leaving or about to leave school. A booklet which will guide nursery superintendents—and be something in the nature of a textbook for younger workers—on the feeding of infants and pre-school children has been prepared by the Department of Health for Scotland; it deals particularly with Scottish requirements and is based on food supplies available in wartime.

A SIMPLE METHOD OF USING PENICILLIN, TELLURITE, AND GENTIAN VIOLET FOR DIFFERENTIAL CULTURE

BY

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Garrod (1942) has recently described the use of gentian violet blood agar for the isolation of streptococci. He recommends that gentian violet should be incorporated in blood agar in a concentration of 1 in 500,000, as on this medium staphylococci, diphtheroid bacilli, and some other organisms are completely inhibited, while haemolytic and other streptococci grow freely. Of course, this medium permits free growth of organisms such as coliform bacilli, *B. proteus*, etc.

In 1931 I tested the bacteriostatic power of gentian violet in human blood on various organisms in slide cells, with the following results:

Test Organism	Concentration of Gentian Violet in Deleucocyted Blood								
	1/2T	1/4T	1/8T	1/16T	1/32T	1/64T	1/128T	1/256T	Control
Staph. aureus	0	0	0	0	0	0	0	++	++
Str. pyogenes	0	0	±	++	++	++	++	++	++
Enterococcus	0	0	0	++	++	++	++	++	++
B. coli ..	0	++	++	++	++	++	++	++	++

1/2T = 1/2,000. ± = Few colonies. ++ = Copious growth.

As a result of these and other observations my colleague Maclean added 1/500,000 gentian violet to glucose broth and found that by this method he could isolate streptococci in pure culture from a considerable number of furuncles (Fleming and Petrie, 1934). These findings confirm Garrod's recently published results, already referred to.

In addition to Garrod, other observers, notably Colebrook and Francis (Colebrook and Francis, 1941; Francis, 1941), have pointed out the great value of gentian violet agar for the isolation of streptococci from infected wounds, and there is not the slightest doubt that blood agar containing 1 in 500,000 gentian violet is a first-class differential medium for this purpose.

Work with Penicillin and Potassium Tellurite

The only drawback to the method described by Garrod is that gentian violet blood agar is a special medium which may not, especially in smaller laboratories, be available when wanted, and its preparation on the spur of the moment is just that extra amount of trouble which may not always be convenient. I have for many years obtained selective cultures by applying to the surface of an ordinary culture medium a selective chemical. I first succeeded in this method with penicillin (Fleming, 1929). Here we had a bacteriostatic substance which was very potent with regard to streptococci, pneumococci, diphtheroid bacilli, and some other organisms commonly found in the respiratory tract, while it had little or no inhibitory action on the influenza bacillus. I showed that when infected material from the respiratory tract was plated on the usual culture media and then a few drops of penicillin were spread on one-half of the culture plate, a small number of influenza bacilli could be isolated from the midst of a mass of cocci. In conjunction with Maclean (Fleming and Maclean, 1930) I demonstrated by this method that haemophilic bacilli of the influenza and para-influenza types were normal inhabitants of the human mouth. By this method also I have isolated Pfeiffer's bacillus from some unusual situations, such as the vagina and infected wounds.

We pointed out then that the most exact method was to incorporate a known amount of the selective bacteriostatic agent in the medium, just as Garrod has later done for gentian violet, but the simpler method of using ordinary laboratory media and, after the plate had been inoculated, applying a suitable amount of the bacteriostatic agent to the surface of the medium was eminently satisfactory for practical purposes.

Later (1932) I showed that the same method could be used with potassium tellurite. This chemical has an extraordinarily selective bacteriostatic action on Gram-negative bacilli such as the coli-typhoid group, Pasteurella, Brucella, and haemophilic bacilli, while it has little action on streptococci, staphylococci, diphtheroid bacilli, etc. In its bacteriostatic action tellurite is almost the mirror image of penicillin—i.e., with few exceptions the organisms resistant to tellurite are sensitive to penicillin, and vice versa; and I have pointed out (Fleming, 1936) that by suitable mixtures of these two substances extraordinarily selective media can be obtained. The use of tellurite on cultures of faeces renders very easy the isolation of streptococci, staphylococci, or diphtheroid bacilli from the midst of large numbers of coliform bacilli.

Tests with Gentian Violet

Recently I have applied to gentian violet the methods which I had previously used with penicillin and tellurite. The first thing to determine was the amount of gentian violet which could be applied to the surface of a blood-agar plate and which would inhibit staphylococci while permitting free growth of haemolytic streptococci. For practical purposes I have found that, in connexion with tellurite, two drops from a capillary pipette (about 80 c.mm.) was a convenient volume to spread with a bent rod over half of an ordinary-sized culture plate.

Blood-agar plates were evenly spread with a mixture of many staphylococci and few haemolytic streptococci. The culture

Culture plate of blood agar inoculated with (top half) a mixture of staphylococcus H and streptococcus 5, and (bottom half) a mixture of staphylococcus H and streptococcus 6. One drop of gentian violet 1 in 3,000 spread on top and bottom right-hand quadrants.

On left side (no gentian violet), confluent staphylococcal growth. On right side (gentian violet), isolated haemolytic streptococcus colonies; no staphylococcus.

medium on these plates was then divided with a sterile knife into two halves. Two drops of gentian violet were put on one half of a plate and *immediately* spread over the surface of that half. The same procedure was adopted with other plates, using various concentrations of gentian violet. It was found that a concentration of 1 in 3,000 completely inhibited the staphylococcus, while the streptococci grew out apparently unhindered.

Tests were then made with a number of strains of *Staph. aureus* to see whether there was any great difference in their resistance to gentian violet. It was found that there were small differences, as has already been pointed out by Garrod (1942), but all were inhibited by two drops of a 1 in 3,000 concentration on half a plate.

The next thing was to ascertain whether this quantity of gentian violet inhibited any of the haemolytic streptococci. For this purpose a small number of 17 different haemolytic

streptococci were inoculated into separate broth cultures of the staphylococcus which had been found to be most resistant to gentian violet (one loopful of a 24-hour broth culture of streptococcus was inoculated into 5 c.cm. of a 24-hour staphylococcus broth culture). The culture medium in a number of blood-agar plates was cut in two with a knife and two drops of the various staphylococcus - streptococcus mixtures were spread over one-half of a culture plate. The plates were then divided in the opposite direction into quadrants, and on to one of the two quadrants which had been infected with a particular bacterial mixture one drop (40 c.mm.) of 1 in 3,000 gentian violet was placed and immediately spread over the plate. The plates were then incubated for 24 hours, when it was found that on the quadrant to which gentian violet was not applied there was a sheet of staphylococcal growth, while on the gentian violet quadrant there were no staphylococci, but well-grown isolated colonies of haemolytic streptococcus numbering from 25 to 500. A typical plate is shown on the preceding page.

That the streptococci grew out in full numbers was shown in some control plates which had been inoculated with the same dilution of streptococci without any staphylococci and without gentian violet.

Conclusion

These experiments show that by the simple method of spreading a small quantity of gentian violet over half of the culture plate of blood agar after it has been planted it is possible to isolate a few streptococci from the midst of a multitude of staphylococci, just as it has been shown to be if the gentian violet is incorporated in the medium.

Whatever chemical is used with this technique it is necessary, when spreading it over half the plate, to start where the inoculum is lightest and proceed towards the heavier inoculum; otherwise there may be so many resistant bacteria that a confluent sheet of growth results.

We have three chemicals which can be used in this way with great advantage in the clinical bacteriological laboratory. They are penicillin, potassium tellurite, and gentian violet. The following table shows the selective action of these substances:

Chemical	Amount to be spread over Half a Culture Plate of Blood Agar	Bacteria inhibited	Bacteria growing freely
Penicillin (crude culture filtrate)	6 drops (about 0·2 c.cm.)	Staphylococci, streptococci, pneumococci, diphtheria group, pathogenic Neisseria, etc.	Pfeiffer's bacillus, B. pertussis, etc.
Potassium tellurite (1 in 1,000)	2 drops (about 80 c.mm.)	Coliform bacilli, B. pyocyaneus, haemophilic bacilli, etc.	Streptococci, pneumococci, staphylococci, diphtheria group, etc.
Gentian violet (1 in 3,000)	2 drops (about 80 c.mm.)	Staphylococci, diphtheria group, B. subtilis, etc.	Streptococci, etc.

The great advantages of this simple method of spreading the chemical over half the culture plate after inoculation are: (1) special media need not be prepared; (2) one-half of the culture plate is an ordinary culture and the other half a selective culture, thus really giving the effect of two culture plates in one.

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E. Shute (*Amer. J. Obstet. Gynec.*, 1941, **42**, 490) gave testosterone propionate to thirty-five patients with vomiting in early pregnancy, because they had high levels of oestrogen in the blood; 80% of these were cured and 14% improved. Fifteen, clinically identical but with low or normal levels of oestrogen in the blood, were treated with an oestrogen, and 70% of them were cured and 20% improved. Dr. Shute observes: "No explanation of the therapeutical effect obtained is attempted beyond the vague impression one gathers that the ship of pregnancy sails the oestrogenic sea best at slack tide."

PIGMENT METABOLISM FOLLOWING TRANSFUSION OF FRESH AND STORED BLOOD

BY

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(N.W. London Blood Supply Depot)

Whether a transfusion of stored blood is as efficacious as a transfusion of fresh blood is still a matter for discussion. It is probable that the relative value of the two fluids varies according to the type of case receiving transfusion. The object of the present investigation was to determine whether the body is able to utilize the haemoglobin of fresh and stored blood to the same degree.

Red cells may be broken down by an intravascular or an intracellular mechanism. When intravascular haemolysis occurs, oxyhaemoglobin, liberated from the red cells, is converted into haematin and globulin. The haematin then unites with serum albumin to form methaemalbumin (Fairley and Bromfield, 1937-8), which is further broken down by the liver and probably excreted in the faeces as coproporphyrin (Rimington, 1939). Under some circumstances haemoglobin and oxyhaemoglobin may be excreted by the kidney. If the urine is acid, oxyhaemoglobin is in part changed to methaemoglobin. Methaemalbumin is never excreted by the kidney. Intracellular haemolysis occurs in the cells of the reticulo-endothelial system, haemoglobin being split up into bilirubin, iron, and globulin. The bilirubin passes into the blood stream, thence to the liver, whence it is excreted into the bile, and appears finally in the faeces as urobilinogen, some probably being retained and used for the synthesis of haemoglobin (Watson, 1938). So long as the liver is efficient large quantities of bilirubin can be excreted, so preventing great alterations in the serum bilirubin level. Again so long as the liver is efficient, urobilinogen does not appear in the urine. The presence, therefore, of methaemalbumin in the serum is an indication of extracellular haemolysis; an increase above normal of urobilinogen in the faeces is, if the liver is efficient, a measure, though not necessarily a quantitative one, of intracellular haemolysis (Vaughan and Saifi, 1939).

Methods

Since the metabolism of haemoglobin is to some extent at least dependent on liver efficiency, it is important to make observations upon individuals whose liver function is normal. The level of serum bilirubin after transfusions of both fresh and stored blood was investigated in 5 healthy individuals. In 2 of these the excretion of urobilinogen was studied as well. The excretion of urobilinogen after transfusions was also investigated in a patient with disseminated sclerosis, and in one with chronic rheumatoid arthritis; in neither was there any reason to suspect any form of liver damage.

The blood used for transfusion was taken by the Medical Research Council technique (M.R.C. War Memorandum No. 1, 1940). In Cases 1, 2, 3, and 4 the diluent used was 180 c.cm. of 1.05% sodium citrate in 0.85% sodium chloride containing 3% glucose; in Case 5 the diluent was 100 c.cm. of 3% sodium citrate to which was added 20 c.cm. of 15% glucose. The total amount of fluid given was 540 c.cm. Faecal urobilinogen was estimated by the technique previously described (Vaughan and Saifi, 1939). Serum bilirubin was estimated by the method of King, Haslewood, and Delory (1937). Dr. Hamilton Fairley examined the plasma for the presence of methaemalbumin.

Results

Serum Bilirubin.—Following a transfusion of fresh blood, the rise in serum bilirubin was insignificant in all cases. After the use of blood stored for 1 week, 2 weeks, or 21 to 25 days there was invariably an appreciable rise in serum bilirubin. The peak of the rise occurred with one exception 5 hours after the transfusion, and then returned more slowly to normal. The highest figures were observed when the oldest blood was given (Table I, Fig. 1).

TABLE I.—*Serum Bilirubin in mg. per 100 c.cm.*

Time	1-day-old Blood					7-day-old Blood	14-day-old Blood					21/25-day-old Blood	
	Case 1	Case 2	Case 3	Case 4	Case 5	Case 1	Case 1	Case 2	Case 3	Case 4	Case 5	Case 1	Case 5
Before transfusion	1·2	1·7	1·16	trace	—	0·2	0·7	1·47	1·22	0·2	—	0·2	0·4
Immediately after	1·1	1·4	1·16	trace		0·2	1·4	1·13	1·46	0·5		2·36	0·6
1 hour after										1·06		3·5	
2 hours							2·0					4·3	
2½		1·7	1·33	0·79				2·3	4·4				2·2
3	1·39	1·1								1·83		4·73	
4						1·1		2·42				4·86	
5		1·4	1·23				3·0	2·7	4·1	2·28		5·28	2·9
6	1·1	1·2		0·94		1·2	2·0	2·3		2·66		4·06	2·1
7			1·1			1·3			3·4	2·85		4·0	
8			0·88	0·71			1·5		3·2	2·5		4·0	1·9
9	1·18											2·81	
10	1·18					1·0						2·0	
20–24		0·45					0·6	1·0	0·4	trace		0·97	1·0

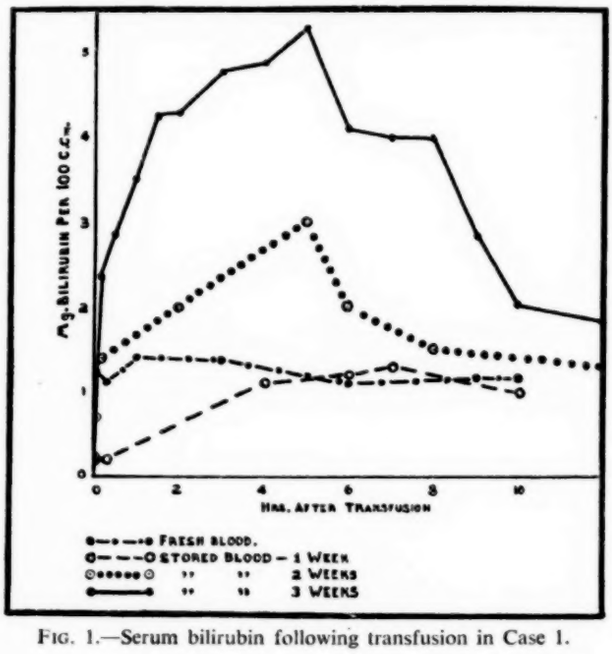

FIG. 1.—Serum bilirubin following transfusion in Case 1.

Methaemalbumin.—No methaemalbumin was detected in the plasma of 3 cases which showed high values for bilirubin. Schumm's test was invariably negative.

Urobilinogen Excretion.—There was a definite rise in urobilinogen excretion in Cases 1, 7, and 8 following transfusions of both fresh and stored blood (Tables II, III, and IV; Fig. 2). In 3 cases the excretion was slightly higher with the older blood than with fresh blood, but the differences were probably too slight to be significant. In Case 1 (Table I, Fig. 2) the excretion level following the use of 14-day-old blood was greater than that with 21-day-old blood; again the difference was probably insignificant. In Case 3 (Table V) the subject was rather constipated, a condition which always makes the interpretation of the results on pigment metabolism difficult. There was a slight rise in excretion after the transfusion of 14-day-old blood, but

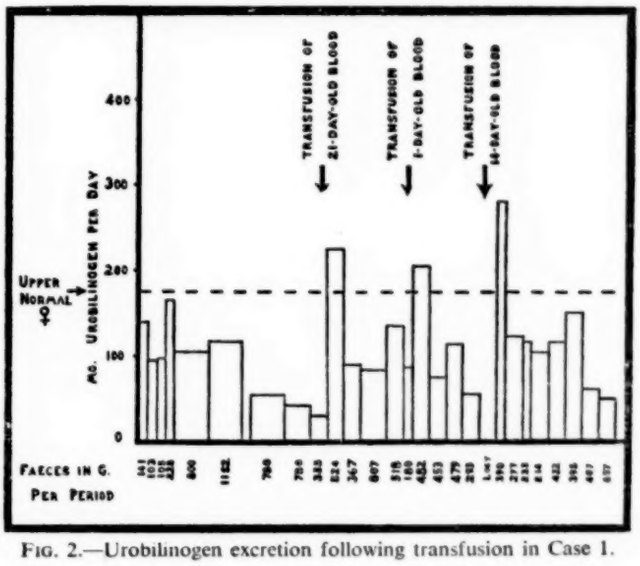

FIG. 2.—Urobilinogen excretion following transfusion in Case 1.

TABLE II.—*Urobilinogen Excretion in Case 1*

Period in Days	Faeces in G. per Period	Urobilinogen Excreted Daily (mg.)	Period in Days	Faeces in G. per Period	Urobilinogen Excreted Daily (mg.)
1	141	140	Transfusion of 1-day-old blood		
1	103	93	2	482	205
1	105	98	2	453	72
1	228	166	2	479	115
4	800	105	2	293	51
4	1,152	118	Transfusion of 14-day-old blood		
Missed period 1 day			1	Lost	Lost
4	780	55	1	390	280
3	780	42	2	277	125
2	335	30	1	233	116
Transfusion of 21-day-old blood			2	214	105
2	524	225	2	422	116
2	367	90	2	395	150
3	807	83	2	407	60
2	518	135	2	607	52
1	180	85			

TABLE III.—*Urobilinogen Excretion in Case 7*

Period in Days	Faeces in G. per Period	Urobilinogen Excreted Daily (mg.)	Period in Days	Faeces in G. per Period	Urobilinogen Excreted Daily (mg.)
2	287	29	2	795	58
3	235	15	2	110	20
3	355	23	3	353	35
3	170	28	Transfusion of 14-day-old blood		
Transfusion of 1-day-old blood			3	122	15
4	472	18	1	188	85
3	297	69	2	237	35

TABLE IV.—*Urobilinogen Excretion in Case 8*

Period in Days	Faeces in G. per Period	Urobilinogen Excreted Daily (mg.)	Period in Days	Faeces in G. per Period	Urobilinogen Excreted Daily (mg.)
3	248	32	2	210	10
2	315	45	Transfusion of 14-day-old blood		
2	441	62	2	311	52
2	258	33	2	251	78
Transfusion of 1-day-old blood			2	108	108
2	270	68	2	163	30
2	465	93	2	272	48
2	194	44	2	177	25
2	267	25			

TABLE V.—*Urobilinogen Excretion in Case 3*

Period in Days	Faeces in G. per Period	Urobilinogen Excreted Daily (mg.)	Period in Days	Faeces in G. per Period	Urobilinogen Excreted Daily (mg.)
2	229	32	2	278	42
2	212	22	2	343	45
2	422	63	2	213	30
2	126	28	Transfusion of 1-day-old blood		
2	297	54	2	284	38
Transfusion of 14-day-old blood			2	105	23
2	258	33	3	285	58
2	298	83	2	277	12
2	252	62	2	239	20
2	227	25	2	390	36

nothing significant after the transfusion of fresh blood. Since all those examined had a normal liver no excretion of urobilinogen in the urine would be expected (Watson, 1938). None was found in Case 1 when 21-day-old blood was transfused.

Discussion

The fact that the level of serum bilirubin rises somewhat after the administration of stored blood but not after the administration of fresh blood suggests that at least some of the cells of stored blood are more readily broken down in the body than those of fresh blood. Since the increased pigment in circulation is bilirubin, methaemalbumin not being found in demonstrable amounts, it seems probable that the breakdown is an intracellular one. The excretion of urobilinogen was, however, unaffected to any appreciable extent by the age of the blood given or by the level of the serum bilirubin. It must therefore be concluded that, though some of the red cells of stored blood are more rapidly broken down than the red cells of fresh blood, the pigment is retained and used by the body. This is also borne out by clinical observations, appreciable rises in haemoglobin being noted in patients transfused with stored blood (Brewer *et al.*, 1940).

Mollison and Young (1940) have shown that the survival rate of cells stored in a glucose-citrate mixture is little inferior to that of fresh blood. The increased bilirubin figures recorded here are presumably due to the presence of a few effete cells in stored blood, which are immediately removed from the circulation and broken down, with liberation of bilirubin. The fact that the bilirubin level returns so rapidly to normal suggests that further undue destruction does not occur—thus substantiating the figures of Mollison and Young.

Conclusions

Observations on serum bilirubin and faecal urobilinogen following transfusions with fresh and stored blood are recorded.

Transfused red cells appear to be broken down by the cells of the reticulo-endothelial system rather than by an intravascular mechanism.

Immediately after transfusion of stored red cells there is an increase in serum bilirubin which is transitory. This increase does not occur with fresh blood, and is presumably due to the destruction of a proportion of the older cells.

Since no gross difference in pigment excretion was found with the use of either fresh or stored blood it is suggested that the pigment which is rapidly liberated after transfusions with stored blood is to a large extent retained and used by the body, at least in normal individuals.

I am grateful to Dr. Hamilton Fairley for his spectroscopic examination of the plasma for pigments, and to Mr. A. Hennington for his technical assistance. The work was carried out with the assistance of a grant from the Medical Research Council.

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H. Gaudin (*New Zealand med. J.*, 1941, **40**, 367), registrar for statistical research, New Zealand Division of the British Empire Cancer Campaign, states that among 4,610 cancer patients during a period of ten years in a general hospital, of whom only 71 were untraced, 256 (5.5%) showed the presence of multiple primary carcinomata. The majority of these cases were those with a primary lesion of the skin, and only 27 were classified as multiple primary lesions of other organs than the skin. J. L. Tullis (*J. Lab. clin. Med.*, 1942, **27**, 588) states that 21 necropsies revealed multiple malignant lesions at the Bellevue Hospital, New York, among 1,044 necropsies with malignant lesions—an incidence of 2%: 17 were males and 4 females, with a combined average age incidence of 58.4 years. Tullis maintains that multiple malignant lesions occur more frequently than can be explained by mere coincidence, and recommends that the clinician should discuss freely with the patient's family the possible familial tendency of the disease.

ANAESTHESIA FOR AIR-RAID CASUALTIES*

BY

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We are now on the crest of a wave of advance in anaesthesia. But for the war, this forward surge might have been of yet greater magnitude. Gas-oxygen came out of the war of 1914-18; much has come since—evipan, vinesthene, and cyclopropane—and it remains to be seen what will evolve from the present conflict.

In civil practice we have been accustomed to forestall shock by the early recognition of the prodromal signs; but in air-raid casualties we are faced with established shock as the cardinal problem. In May, 1941, we in Liverpool became all too familiar with the shock syndrome, and observed the earthy pallor, the profound muscular weakness, the sweating, the sighing or spaced respiration, and the dilated pupils, and knew the significance of the thin, thready, or bounding pulse. The pathology underlying these signs and symptoms is a fall in blood pressure due to a diminution of the circulating blood volume. Apart from haemorrhage, the blood is probably in the capillaries of the relaxed muscles.

Air-raid casualties are usually covered with dust and very often burned. On admission to hospital they are put to bed, given morphine, kept warm, and rested with the foot of the bed raised. After 1 to 2 hours the shock has abated somewhat in many of the cases. Those suffering from loss of blood are transfused with blood, those from shock with plasma. Occasionally patients require immediate operation. The injuries are usually multiple. Premedication with atropine is not essential, but if the patient will stand it a small dose of omnopon and scopolamine helps the anaesthesia. Good co-operation between the surgeon and anaesthetist ensures maximum efficiency. The more serious lesions are dealt with first as a rule. The anaesthetist should be in charge of the resuscitation measures and know when to apply them or to direct their application.

The Shocked Patient

There are three main precepts to be borne in mind before administering an anaesthetic to a shocked patient:

1. It should be realized that the patient is "nigh unto death," and, in consequence, deep anaesthesia in any form is contra-indicated. In everyday practice it is well known that the degree of shock produced by a long period of deep anaesthesia is equalled by that produced by a much longer period of light anaesthesia. At the same time it must be remembered that light anaesthesia, if inadequate, may itself result in shock by allowing the passage of noxious stimuli. My own opinion is that there is a certain stage in light anaesthesia which is just as effective in protecting the higher centres as is very deep narcosis. Certain reflexes are only partially abolished by deep anaesthesia. In these circumstances the combination of local and light general anaesthesia is rational when possible. The signs of light anaesthesia are more difficult to detect in shock. The eye signs are often of no value, but respiration changes are appreciated by those with a keen sense of observation. Slight tidal changes and occasional hesitancy are indicative of a plane of depth which is becoming too light. A pause in the operation may help the anaesthetist to deepen the plane sufficiently if he has been caught napping.

2. The same amounts of drugs that produce the effects of light anaesthesia in the normal patient may be sufficient for overdose in the shocked patient. The golden rule is to let the anaesthesia fit the patient and not the patient fit the anaesthesia.

3. The function of respiration must not be embarrassed by undue stimulation, by interference with the airway, or by suboxygenation.

If any anaesthetic agent is forced upon a patient in high concentration there may be a protective laryngeal spasm and an abnormal increase of secretions. When the spasm has been overcome an exaggerated type of respiration results. This condition might well be termed "traumatic anaesthesia." Gradual changes in concentrations are never so important as in shock.

* Being the substance of a paper delivered before the Liverpool Society of Anaesthetists in Jan., 1942.

Prevention of the free passage of respiratory gases makes the control of depth of anaesthesia impossible and sets up reflexes which may provide further hindrance. Chronic slight obstructions cause an increase in the muscular efforts of breathing which may conceal the onset of asphyxia. Anoxaemia is to be avoided at all costs as it is already present in shock. If it is found difficult to keep the airway free by simple mechanical means, then the larynx should be intubated without delay.

In a normal person, to limit the oxygen in the inspired air to 10%, even in the presence of a free airway, predisposes to a certain amount of shock. Pure gas-oxygen is such a weak anaesthetic that it may require this reduction in order to be effective. The addition of a minimal quantity of ether allows of an increase of oxygen to a normal percentage, and this combination is more rational than the former in shock. It is hardly necessary to have to condemn secondary saturation with gas-oxygen: it is a procedure of doubtful value in the most robust individual.

Light open ether anaesthesia can give very satisfactory results if the drops are properly regulated, the gauze is sufficient in quantity and quality, and the jaw is postured so as to allow a perfectly free airway. A tube from an oxygen cylinder can be placed under the mask and a trickle of oxygen given if necessary.

The Closed-circuit Method

Warmed ether, with Shipway's apparatus, was used extensively during the last war and, I believe, with good results. Nowadays other methods are employed, such as the closed circuit and partial rebreathing. If the operation is prolonged the value of carbon dioxide absorption technique is unquestionable, and the chief reasons are: (1) The prevention of heat and water-vapour loss by the pulmonary route. (2) The quiet breathing due to cutting down the carbon dioxide in the inspired air. Compare this with partial rebreathing in which, if the expiratory valve is closed sufficiently to cause slight positive pressure, the percentage of carbon dioxide may be about 4 or more. In closed-circuit work the carbon dioxide is in the neighbourhood of 0.5%, using the circle type of circuit, with the valves on the machine. With the valves at the face-piece the value may well be much lower. (3) Quiet breathing conserves the muscular energy. (4) Oxygenation is good. (5) It is relatively much easier to maintain a constant plane of anaesthesia.

The two keys to successful closed-circuit work are the maintenance of a clear airway and the avoidance of leakages of gases from the circuit. The commonest site for leaks to occur is between the mask and the face-piece. The newer types of mask manufactured in America, having curves to fit the face, are almost indispensable.

There is one combination as to the value of which there is controversy, but which, in my cases, has been fully justified in its results. A small dose of intravenous barbiturate is injected slowly and cyclopropane is then given by means of carbon dioxide absorption. The cyclopropane raises the blood pressure, tending to counteract the barbiturate. Much less of this gas is needed when shock is present, but induction is rapid, oxygenation is increased, and respirations are not stimulated. Recovery is rapid and unpleasant sequelae are unusual. If the plane of anaesthesia is kept light, cyclopropane does not appear to affect the heart adversely. With local analgesia in addition this method is, I consider, excellent for abdominal cases.

For extra-abdominal cases intravenous pentothal is followed by gas-oxygen, and if this is insufficient cyclopropane is added rather than ether. The combination of ether and cyclopropane is unnecessary in shock, and the effects are worse than if either of these had been used alone. The modern tendency seems to be to avoid the lipoid-soluble drugs for shock. Whether this policy results in greater safety than the old policy it is too early yet to pass an opinion, and much clinical trial is required. Certainly it appears that the newer anaesthetics are less harmful.

Intravenous barbiturate, provided the injection is made slowly and as soon as the patient is asleep and a safety pause of about 45 seconds is allowed to occur before further injection, is perfectly safe for the shocked patient. It may, alternatively, be given in conjunction with a drip saline. Oxygen should be at hand. If respiration fails, regular manual compression with a bag filled with this gas is nearly always successful.

Some Contraindications

The use of spinal analgesia for the air-raid casualty is contraindicated if there is any degree of shock. Occasionally, however, spinal anaesthesia benefits a patient who is in great pain from injury to one or both lower limbs; in this way shock may actually be relieved. In the vast majority of cases, however, the patient has already undergone much mental suffering and is not willing to put up with any more—even though it be only a prick in his spine.

Local analgesia is best used in conjunction with light general anaesthesia, but more often than not is contraindicated owing to the risk of sepsis. One point is nevertheless worthy of mention. Gauze soaked in 1% novocain may be packed into a lacerated wound and left for about 10 minutes with good effect, and this avoids the spreading of infection by injection. Extensive infiltrations of novocain, even where there is no risk of sepsis, as, for example, in a brachial plexus block, may result in a lowered blood pressure and are therefore best avoided.

Chloroform was used in the war of 1914-18 in many cases of injury with shock. Its use in modern times is hardly justifiable at all in the shocked patient, and I think its only place is in cases of chest injury for which diathermy is considered essential. Even then it can be replaced with trichlorethylene in conjunction with an intravenous barbiturate. It has been said that while chloroform kills on the table, ether kills afterwards. I have little doubt that chloroform kills both during and after. In the hands of an expert, light anaesthesia may be effective, but there is always the danger of sudden cardiac failure.

Preparing for Immediate Operation

If immediate operation is necessary the possibility of a loaded stomach should be remembered. The Trendelenburg position must be adopted immediately vomiting occurs. A powerful suction pump should be at hand. Endotracheal insufflation should be practised prophylactically. Sterilized Magill tubes must be ready. I cannot urge too strongly upon anaesthetists the advisability of familiarizing themselves with the introduction of endotracheal tubes. In an emergency it is best to intubate by means of a laryngoscope, though it may well be that at the critical moment the jaw muscles are not relaxed enough. In this case blind nasal intubation may be successful. One further point: a Magill tube may not be easy to insert and a straight gum-elastic tube of the St. Bartholomew's or de Caux type will be easier to introduce. Of course, sometimes the tube may not quite fit the trachea, and it may be necessary to pack round the larynx with ribbon gauze. A Magill tube with balloon cuff is invaluable in some cases. Tracheotomy instruments should be sterilized and ready in this type of case. A Magill tube may be quickly cut so as to serve instead, and a safety-pin inserted into the proximal end to anchor it with tapes.

Induction in Various Types of Case

One type of casualty requires special mention—the patient who has for some days been buried under debris. There will be shock and toxaemia in addition to starvation. In this type of case, if surgery has to be attempted, a glucose intravenous drip is best put up beforehand, and pure gas-oxygen will in most cases be sufficient as the surgery will have to be limited (perhaps completing an amputation, etc.). It will not be necessary to cut down the oxygen in most cases, and when this anaesthesia is not enough a minimal quantity of ether will suffice.

If a patient has to be extracted from wreckage by amputation of a limb, the problem of anaesthesia depends on which part of the anatomy is within reach. A choice has to be made from open ether, intravenous morphine, or a barbiturate. If morphine is the only drug available it is necessary to cleanse the skin thoroughly, apply antiseptic, and take a syringe holding 1/4 grain of the drug. Inject about one-quarter of the contents and observe the result. If this is judged to be insufficient, repeat the same quantity till the desired effect is produced. This is much safer than giving a single injection.

In facial injuries induction presents a problem. An intravenous barbiturate is useful where there is no danger of inhaling blood and where the veins are accessible. It is often essential to carry on anaesthesia by the endotracheal route. Blind nasal intubation may be out of the question because the bones of the face may be reduced to a pulp of lacerations. In this case open

ether anaesthesia will be the method of choice till a laryngoscope can be inserted. The induction is best performed with the mask at some distance from the face and by allowing the heavy ether vapour to fall. Gradually the mask is lowered till the patient tolerates the position.

Restoratives

With regard to restoratives and resuscitation it is the anaesthetist who is best equipped and best able to act as consultant. Where blood has been lost it must be replaced with whole blood. Where a patient suddenly becomes shocked without haemorrhage plasma is indicated. An intravenous injection of 50% glucose given in a dose of 40 to 80 c.cm. will draw fluid from the tissues to the blood stream in cases of failing circulation. Coramine may be useful to stimulate respiration in this type of failure, and veritol is a useful stimulant in failure of the circulation which is peripheral in origin. Carbon dioxide should always be used sparingly, preferably as a 5% mixture with oxygen. Usually carbon dioxide is contraindicated in shock as the respirations are laboured.

Oxygen given by the B.L.B. mask helps to safeguard the patient on his way back to the ward. This gas is particularly useful in shock because death, if it occurs, will be due to anoxaemia. True, the tissues may be incapable of utilizing it from the corpuscular elements of the blood, but if oxygen diffuses in the serum there is much more chance of its being used.

In the profoundly shocked patient who is already too far gone for surgery to avail, the oxygen tent may bring about recovery when it would not otherwise have taken place.

ASTHMA TREATED WITH PATIENT'S BLOOD SERUM

BY

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(From the Welsh National Memorial Association)

For a number of years I practised in a country where hay-fever was very prevalent, and many sufferers sooner or later developed an associated asthma. A fairly large number of cases were treated by giving injections of the patient's own blood serum. Every case showed considerable improvement or entire disappearance of symptoms after one course of treatment. Those who had repeated courses seemed to be permanently desensitized, as they continued to live for a number of years, free from symptoms, in the environment which had produced the hay-fever. Having these results in mind, it was decided to use this treatment in asthma not associated with hay-fever. In the following cases, the only ones so treated to date, the results were so spectacular that, in view of the previous results in allergic cases, it seems desirable to publish them in order that others may give this method a trial.

Case Reports

Case 1.—The patient, a woman aged 20, had had a cold in March, 1937, and began to have severe asthmatic attacks. Adrenaline hypodermically was necessary for relief. Attacks often recurred, usually several times in one day, and she was never free for more than 2 or 3 days. She had been under observation in a general hospital in June, 1937. Radiographs of the chest revealed no evidence of any pulmonary lesion. Skin-sensitivity tests gave strongly positive reactions to eggs and feathers. Avoidance of these two offenders did not result in freedom from attacks, which recurred in about the same numbers, but the eating of eggs or the use of a feather pillow appeared to precipitate more frequent and severe spasms. The condition remained about the same, adrenaline being necessary almost daily, until May, 1940, when appendicectomy was performed. For a few months afterwards the asthma seemed less severe, although still troublesome. At this time radiographs of the chest were repeated, but no evidence of a pulmonary lesion was found. On Dec. 12, 1940, the patient was sent to a tuberculosis dispensary because of increased cough and sputum and loss of weight. Radiographs disclosed dense shadows in the right upper lobe, and the sputum was T.B.-positive. She was admitted to the Glan Ely Tuberculosis Hospital on Jan. 25, 1941.

The asthma was severe, and adrenaline was necessary for relief almost every day until Feb. 24, 1941. From that date one or more injections were necessary every day, and the patient appeared to be distressed continuously. In August I suggested the use of the patient's own serum. The first injection was given on Aug. 18, the amount being 1 c.cm. On the 19th 1.5 c.cm. was given, and the dose was then raised to 2 c.cm. and repeated every other day until 12 doses had been administered. From Aug. 22 to 27 no adrenaline was necessary. One injection of 5 minims of adrenaline was necessary for mild spasm on Aug. 27 and 29 and Sept. 1 and 2. Since then there has been no suggestion of asthma. Eggs have been eaten and a feather pillow has been used. On Nov. 4 the patient was still free from any asthmatic symptom. Unfortunately the tuberculous lesion progressed, and she died on Dec. 21.

Case 2.—The patient, a youth aged 19, was admitted to Glan Ely Hospital on Nov. 29, 1941, for tuberculosis of the spine. He gave a history of bronchitis and asthma since infancy (7 months), and on account of asthmatic attacks had been unable to attend school for more than 3 months in all. In hospital he had severe attacks, requiring repeated adrenaline injections. Treatment with his own serum, similar to that in Case 1, was started at once, and no asthmatic attack has occurred during the intervening 4 months. Cough and sputum, from which he could not remember being free, decreased, and both have been absent since the beginning of January.

Technique

By employment of a sterile syringe and test-tube, or preferably a vacuum venule, some 30 c.cm. of the patient's blood is drawn and allowed to clot at room temperature for about 2 hours. It is then stored in a refrigerator. Serum is drawn off the top as required and injected subcutaneously. It was noted in all cases treated, including the one reported, that a much firmer clot formed as the treatment progressed, and proportionately more serum was expressed. No local or general reaction has been noticed. Many patients who were treated for hay-fever by this method remained free from colds for long periods afterwards, although they had previously been very susceptible.

I wish to thank Dr. A. Brownlee, medical superintendent, for his co-operation and for permission to report these cases.

DISTRICT NURSING IN LONDON

The twenty-seventh annual meeting of the Central Council for District Nursing in London was held at County Hall under the chairmanship of Sir William Collins. The annual report stated that during the past year 176,000 visits had been paid by district nurses under the scheme of arrangement with the London County Council, and of this number 92,000 had been general nursing visits, and 84,000 had been for the purpose of giving insulin to diabetic patients. Despite the return of many people to the county of London, and the inclusion of supplementary pensioners, for the nursing of whom the L.C.C. has undertaken financial responsibility, the number of visits has not reached the pre-war total, and therefore the Central Council has deemed it unwise to press for an increase in the amount of the block grant of £4,400 per annum which is given by way of subsidy to district nursing associations. Work by nurses in school treatment centres has, at the request of the County Council, been resumed in certain areas by the associations. The scheme whereby King Edward's Hospital Fund pays associations for work in attending patients referred from voluntary hospitals has now been extended to include the whole metropolitan area, but the extra expenditure on district nursing brought about by the increase of the area, as well as by any higher rate per case that may be sanctioned, is not yet known. For the present year the sum of £2,000 has been distributed on this account. On the subject of nurses' salaries the report stated that the recognition that an increase was due had been hastened by present-day conditions, and the Ministry of Health's committee under Lord Rushcliffe has specifically included district nurses' salaries in its terms of reference. The Queen's Institute of District Nursing and the Ranyard Nurses have already adopted higher scales, but the matter will be difficult for some of the local associations unless they receive a State grant or increased amounts from their local authorities. To the eighty-four district nursing associations in the metropolitan area the sum distributed in 1941 was £11,707, of which nearly £7,000 came from the L.C.C.

Medical Memoranda

Polycythaemia Vera with Low White Cell Count

Various workers have studied the white cell count in cases of primary polycythaemia vera (Vaquez-Osler disease), and the consensus of opinion is that the leucocytes are usually increased, like the red cell count and the haemoglobin concentration. Parkes Weber and Bode (1929) stated that the white cell count usually reaches 20,000 to 30,000 per c.mm., and they quoted the findings of other authors referring to counts of 50,000 to 91,000. The differential count in such cases shows that from 80% to 85% of the leucocytes are polymorphs.

Frankly leukaemic white cell counts have been reported in the later stages of polycythaemia by a number of authors, and polycythaemia may develop in the late stages of leukaemia (Parkes Weber and Bode, 1929; McAlpin, 1929; Whitby and Britton, 1939). Kellmann (1939) reviewed the literature on the white cell count in polycythaemia and again emphasized the extreme frequency of polymorphonuclear leucocytosis, himself reporting a case in a child with definite leukaemic manifestations. Although a polymorph leucocytosis is thus seen to be the usual finding in polycythaemia vera, low white cell counts have been recorded on a few occasions. Parkes Weber and Bode (1929) referred to counts of 1,080 and 4,000 white cells per c.mm., while Cross (1931) recorded two cases with counts of 6,700 and 8,400 per c.mm. The clinical and haematological findings in our case were as follows.

CASE REPORT

The patient, a man aged 44, had complained of "spots in front of the eyes" for several years; this condition had become worse during the last twelve months. A few weeks before admission he had complained of headache, weakness, loss of energy, indigestion, and tightness in the chest. On examination the typical facies of polycythaemia, with congested conjunctivae and florid complexion, was seen. The blood pressure was 130/95. The spleen was hard and considerably enlarged, extending half-way towards the umbilicus.

On October 4, 1941, the patient was bled, 16 oz. of blood being removed. From October 6 to 11 (inclusive) the chest and abdomen were given *x* rays, a total of 150 *r* units being administered. From the 19th to the 24th (inclusive) further *x*-radiation was given, the total dosage again being 150 *r* units. The spleen became noticeably reduced in size after this treatment.

On October 2, before treatment was started, the haemoglobin was 150%, the red cells 7,000,000 per c.mm., while the white cells numbered only 5,200 per c.mm. On the 16th, after a week of *x*-radiation, the haemoglobin was found to be still 150%, but the red cell count had fallen to 6,115,000 per c.mm. and the white cell count to 4,400, the differential count being 88% polymorphs and 12% lymphocytes; the stained film showed some megaloblasts. On October 27, after the second course of *x*-radiation, the haemoglobin was 140%, the red cells 5,810,000 per c.mm., while the white cell count had fallen still lower, to 3,400 per c.mm.

We wish to thank Dr. C. Lawson Stote for allowing us to publish the clinical details of this case, and Dr. John Lavelle for furnishing details about the *x*-ray treatment.

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Reviews

ELECTROCARDIOGRAPHY

Clinical Aspects of the Electrocardiogram, including the Cardiac Arrhythmias. By Harold E. B. Pardee, M.D. Fourth edition, revised. (Pp. 434; illustrated. 35s.) London: H. K. Lewis. 1942.

Those who ten years ago believed that the electrocardiogram had yielded as much information as it was likely to in the study of heart disease must have been increasingly astonished at the ever-widening scope of electrocardiography. Dr. Harold Pardee, in the fourth edition of his book, has brought this subject completely up to date. The latest notable development—chest-lead electrocardiography—has naturally received special attention; in fact, publication has been delayed so that this subject could be presented in the most complete form. Another valuable chapter is that dealing with the clinical significance of abnormal waves; in this the author states the fundamental principles of electrocardiographic interpretation. Emphasizing the facts that repeated records are often necessary before it can be decided whether an abnormal record represents a structural or a functional change, and that those due to the latter are of relatively short duration, he points out also that drugs such as digitalis, toxins, hormonal dysfunctions, and vitamin deficiency are among influences which must be considered in cardiographic diagnosis.

The development of an accurate instrumental method for the appraisal of myocardial function has unfortunately encouraged many with little clinical experience to draw unwarranted conclusions from the record. It is therefore good to see here denounced the fallacy that the electrocardiogram may as an isolated fact afford a basis for prognosis. Dr. Pardee points out that much remains to be worked out concerning the role of the electrocardiogram in prognosis; and he rightly deprecates the fact that the physician is so often called upon to read the future. His statement of the factors controlling prognosis is of fundamental importance: the aetiology of the disease, the rate of progress and response to treatment, the present extent of the disease and the degree of interference with cardiac function, and the possibility of repair of defects and restoration of function.

This work is of the high standard that would be expected of an eminent authority, and it is only a pity that the electrocardiograms themselves do not uniformly reach a parallel degree of excellence.

MENSTRUAL DISORDERS AND STERILITY

Diagnosis and Treatment of Menstrual Disorders and Sterility. By Charles Mazer, M.D., F.A.C.S., and S. Leon Israel, M.D., F.A.C.S. (Pp. 485; illustrated. $6.50 or 39s.) New York and London: Paul B. Hoeber.

Sterile marriage is often a source of the greatest personal distress to the parties concerned. Its importance is not, however, confined to the four walls of the childless home, for when it is remembered that approximately 15% of all unions are unfruitful the problem can be viewed in the true perspective of national and international importance. The challenge it presents to the medical profession has in the past been too seldom accepted, but with the demands a world war is making on men and women alike an adequate response to this challenge becomes imperative if youth is to play its fair part in building the new world. This being so it would be difficult to think of a more appropriate time for the publication of a book so informative and stimulating as Mazer and Israel's *Menstrual Disorders and Sterility*. These two authors, who have established a wide and justly earned reputation for their excellent work at the University of Pennsylvania, write with authority on menstrual disorders. The work they have now published is a most carefully compiled and detailed account of the subject which should commend itself to all interested in diseases of women. The authors claim that the book is written primarily as a guide to family physicians, who are the first to see and treat the numerous women suffering from menstrual disorders and sterility. This claim is a modest one. It would be safe to prophesy that the volume will become a recognized classic on the subject, and its wealth of detail and instruction will probably be of greater value to the consulting specialist than to the practitioner.

A concise account of the physiology of the pituitary gland and ovary prepares the way for an excellent description of

puberty in the female. It is interesting to note, however, that in spite of, or perhaps because of, the publicity she was given by the lay press, Lena Medina of Lima, Peru, receives no mention in this section, nor is any reference made to the syndrome of Albright which she illustrated. This minor omission is the only relevant one detected in the whole volume.

After a description of the normal menstrual cycle, including a survey of the hormonal balance of menstruation, a chapter is devoted to each of the subjects of dysmenorrhoea, premenstrual tension, menstrual migraine, abnormal breast hyperplasia, cyclic intermenstrual pain, and vicarious menstruation. Amenorrhoea and uterine bleeding are then fully discussed from every point of view in a series of the finest chapters yet written on these subjects. The concluding section of the book deals with the problem of sterility. The reader is reminded that potent males and patent tubes are not the only factors to be considered, and an excellent review is made of the investigations necessary if the best results are to be obtained. These investigations are concerned with the five aetiological factors in sterility: gross pelvic lesions, tubal patency, cervical conditions, endocrinal dysfunctions, and male lesions. The reward of thorough work is revealed by the encouraging results of Meaker and others, who reported 50% success, while the authors record the even better figure of 65% in a series of 202 treated cases.

An excellent bibliography, and an appendix summarizing the available commercial endocrine products, complete the volume, which from every point of view is an outstanding production.

CARE OF AGEING TISSUES

Treatment of the Patient Past Fifty. By Ernst P. Boas, M.D. (Pp. 324; illustrated. $4.00 post paid, or 22s.) Chicago: The Year Book Publishers, Inc.; London: H. K. Lewis and Co., Ltd. 1941.

The subject of this book, as Dr. Boas urges, is becoming of increasing importance since all vital statistics show that the proportion of seniors to juniors is steadily rising. Consequently the physician is called upon more and more to treat older patients. At the same time heavily increased taxation makes it necessary for many to go on working beyond the age at which they would have formerly retired. It is therefore important not only to treat their diseases but to maintain them in a state of efficiency. There appear to be two schools of thought in this matter: one regards the involuntary changes of ageing as inevitable; the other seems to look upon ageing as a form of chronic disease. Really the truth, as so often, lies midway between those two views. Tissue culture has taught us that cells living idly in a suitable nutrient environment do not appear to age, but Carrel showed that his chicken tissue cultures were impaired by the addition of serum from an old bird, though not from a young one. This does suggest that in their passage through life organisms acquire something which slows them down for the terminus.

Ageing, of course, begins from the moment of birth, and there must be a gradual diminution of the outburst of energy which results from the reconstitution of the nucleus at fertilization. Such ageing affects different tissues at different epochs; Michael Foster was wont to lament that while the eye was at its most perfect it was chiefly used as a toy, and then fell into a cloudy old age when it could do good service to a still active brain. The ageing of every tissue depends on three factors: heredity, the external environment, and the internal environment of the body. But in addition there comes the factor of chronic disease. Dr. Boas emphatically regards arteriosclerosis, for instance, not as a simple senescent process but a pathological one that we may hope eventually to bring under control. In the meantime he gives sound advice concerning the ills that continue to afflict longevity. We would, however, call special attention to his wise attitude towards the psychological aspect. Economic and social insecurity play a large part in hastening mental deterioration in older persons. We are apt to draw the unwarranted conclusion that many of their mental and emotional characteristics are biologically inevitable when they really result from external social conditions. The physician must address himself not only to controlling the progress of organic disease but also to maintaining his patient as a useful member of society. This will lead him beyond the strict domain of medicine. To any form of euthanasia Dr. Boas is opposed root and branch.

Notes on Books

Anything Dr. Albert Schweitzer writes is worthy of respectful attention, for no man lived more thoroughly up to what he professed. Famous in academic circles as a philosopher, theologian, and musician, he gave up a conspicuously successful career to go to a pestilent spot in West Africa as a medical missionary. Mrs. C. E. B. RUSSELL has essayed a brief introduction to his philosophy of civilization under the title *The Path to Reconstruction* (A. and C. Black, 3s. 6d.). She sums it up in these words: "The greatest possible material freedom for the greatest possible number of people is required by civilization, but it is only through the principle of reverence for life that we can reach the standards of economic justice about which we have to arrive at an understanding." True, but will this age, filled with a passion for destroying life, listen? We fear that this rather sentimental exposition by a faithful disciple will fall on ears deafened by the voice of battle.

A review of *Lymphatics, Lymph, and Lymphoid Tissue: Their Physiological and Clinical Significance*, by C. K. DRINKER and J. M. YOFFEY, appeared in our issue of November 8, 1941. This work (No. 2 of the Harvard University Monographs in Medicine and Public Health) is now published in this country by the Oxford University Press at 22s. 6d.

Volume 66 of the *Transactions of the American Gynecological Society*, for the year 1941 (St. Louis: C. V. Mosby Co.), provides varied fare for those whose interests lie in midwifery and diseases peculiar to women. All the 21 papers, long and short, have already appeared in the *American Journal of Obstetrics and Gynecology*. They are preceded by a record of the society's meeting a year ago at Colorado Springs, and followed by a memoir of Thomas Benjamin Carroll, who died at Pittsburgh, where he had spent the whole of his professional life.

Preparations and Appliances

TABLETS OF METHYL TESTOSTERONE

The Organon Laboratories have prepared tablets containing 5 mg. methyl testosterone which are sold under the name "neohombreol (M)." Methyl testosterone is the derivative of testosterone, the male hormone, which is most active when taken by mouth. The makers say that the tablets are primarily intended for the treatment of cases showing deficiency of the testicular internal secretion. It should be clearly understood, however, that the evidence indicates that male hormone preparations—e.g., injections of testosterone propionate—have little value for minor degrees of male hormone deficiency, and are indeed disappointing in the treatment of this condition, which is so commonly met. It is in the treatment of castrates and eunuchoid subjects that these androgenic substances are so successful. The makers also refer to the value of methyl testosterone for the treatment of women suffering from dysmenorrhoea and excessive uterine bleeding, or to suppress lactation. These effects lie within the capacity of methyl testosterone, it is true, but it has other masculinizing effects which make its use for this purpose questionable.

A FRACTURE TABLE

Orthopaedic surgery makes many more demands upon posturing of the patient during an operation than any other branch of the art. From the mere application of a plaster splint to the nailing of a hip or a spinal bone graft the whole range requires special facilities for supporting and positioning the patient which are not provided by the ordinary operating table. Several good orthopaedic tables have been produced: some simple attachments of limited scope, others complicated pieces of mechanism capable of holding the patient in almost every conceivable position. The new American Albee-Comper orthopaedic table—handled in this country by Messrs. Philips Metalix—belongs to the latter type, and undoubtedly provides every movement and posture, whether of limb or trunk, that the modern orthopaedic surgeon could possibly desire.

The table is rather too complicated to describe briefly, but the fact that it is sponsored by F. H. Albee is sufficient guarantee that it stands in the front rank and is a real practical production.

In the March number of the *British Journal of Radiology* Dr. Douglas Boyd of Belfast describes, with illustrations, a simple radiographic table for Smith-Petersen pinning of the femoral neck.

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CANCER RESEARCH

There is still a tendency to ignore the fact that experimental cancer research, like most other branches of scientific endeavour, has made remarkable progress, especially during recent years. Fortunately, however, it is a tradition with the Imperial Cancer Research Fund that each successive annual report—the latest of which, the 39th, is now available—shall contain a simple explanatory commentary on matters of current interest in the general world of cancer, and these contemporary records now reveal in broad outline the course which thought and effort have followed during an important period of change. The reports also supply, in a quite unpremeditated way, illustrations of how, for instance, many of the problems that once were serious are no longer thought of as ever having required investigation at all, so completely and naturally have the explanations become merged in the body of fundamental common knowledge. The Fund, the first-formed of all organizations devoted solely to the study of cancer, was founded only 40 years ago, and it is interesting to find that Sir Robert Muir, now a life governor, was a member of the original General Committee and presumably one of those actually present at the first formal meeting on July 25, 1902. And yet as recently as this foundation date contemporary knowledge was so slight, and contemporary statistics so inadequate, that among the first tasks which had to be undertaken by the newly formed body was the stimulation and co-ordination of world-wide inquiries to determine whether any race of man is really immune from neoplastic disease, as had been confidently asserted. The immediate importance of the inquiry lay largely in the possibility that by this means information could be obtained pointing to significant effects on cancer incidence of environment, diet, social conditions, or racial characters. Similarly, and for like reasons, the question whether or not cancer occurs in all species of animals had to be investigated: in fact, it was even necessary to conduct exhaustive histological investigations to determine beyond reasonable doubt whether cancer in lower animals is indeed the same disease as the familiar neoplastic condition in man, for many still strongly denied the possibility. It was found necessary also to devise and test more elaborate forms of tabulation of human statistics, so that age and organ incidence could be found. Sir Holburt Waring, the present honorary treasurer of the Fund, and Sir Hugh Lett, one of the present life governors, took part along with others in these preliminary hospital investigations which resulted in an extensive reorganization and improvement of the methods to be adopted thenceforth by the Registrar-General in the collection of information concerning cancer incidence and mortality in this country.

As time passed centres of cancer research multiplied throughout the world and progress became more and more rapid. The solution of one problem was but an early stage in the solution of further problems. Soon after the discovery in America that cancer can be produced in animals by means of coal tar the laboratories of the Imperial Cancer Research Fund were using tar as part of a technique for the study of problems related to that of *how* cancer is produced. Rous in America discovered the filterable fowl tumours, and soon we find the Fund investigating the active agents and the way in which new hosts are infected. These annual reports of the Fund thus provide many good examples of that shuttlecock progress of science which has been facilitated so enormously by modern means of communication, for they illustrate how results obtained in one part of the world are soon verified and extended in another. In this report for 1941-2 Dr. W. E. Gye, the present director, himself mentions how between 1907 and 1911 Dr. J. A. Murray, working in the laboratories of the Fund, found in mice that the offspring of mothers afflicted with cancer of the breast are themselves more liable to develop cancer of the breast than are other mice. He mentions, too, how this work, though discontinued in England, was soon carried to further stages by workers in different parts of America, notably by Leo Loeb, C. C. Little, W. S. Murray, and J. J. Bittner. Workers in the laboratories of the Fund have now again taken up the clues, the position to-day being that the occurrence of breast cancer appears to be commonly dependent upon the simultaneous presence of three favouring factors: a hereditary factor, susceptibility; a factor, presumably a virus, found in the milk of certain mice of cancerous tendency; and a hormone related to pregnancy. Work along these lines is long and tedious if only because of its dependence upon the availability of closely inbred strains of mice possessing special characters. Some of Bittner's milk-factor observations, as elsewhere, have already been confirmed in the laboratories of the Fund, which is a matter of importance in view of the very great theoretical and practical significance of Bittner's original claims.

Other work at present in progress in the laboratories of the Fund can receive only brief mention. Investigation of the histological structure of the pituitary gland is being continued, partly because observations of general significance are being made and partly because it is desirable to know more of this organ in view of the prominent part it plays in connexion with the complex but still imperfectly known general hormonal changes which accompany, perhaps complement, that action of oestradiol which influences the incidence of spontaneous and induced breast cancers in mice. Studies of the Golgi apparatus in cells of the uterine epithelium of rats have shown that in this animal specific changes are correlated with the different phases of the oestrous cycle, and that these changes are accentuated by brief treatment with oestrogens. Studies conducted by improved methods involving the use of modern chemical carcinogens have shown that conditions which obtain in healing wounds favour the appearance of progressively growing malignant tumours at such a site. This finding is in agreement with the original observations of Deelman and with the confirmatory findings of Rous and others already published. It also gives further support to the general belief that trauma—a fracture for instance—may sometimes be the determining cause of a malignant tumour in man. Other studies are concerned with the actions of carcinogens on cells in tissue culture. Non-specific aberrations of mitosis have been observed in abundance, but no transformation to the malignant state has been detected. Work upon filterable fowl tumours has also been undertaken; Claude's finding that dialysis increases the potency of filtrates of the Rous sarcoma No. 1 has been confirmed, and it has been shown that the same phenomenon is observable in other tumours as well. Search for a substance having specific injurious effect on cancer cells in the body is being energetically pursued in the conviction that, as sulphanilamide and penicillin so powerfully affect bacterial infections, some such substance may also be found effective against cancer.

G.P.s AND DIPHTHERIA PROPHYLAXIS

Last week a circular was issued by the Ministry of Health urging that continued and greater efforts should be made during the coming weeks to increase the number of children immunized against diphtheria. If this can be done during the spring and summer we shall be prepared for the autumn attack of the Klebs-Loeffler bacillus. As the result of the efforts made since the beginning of the war, at least one-third of the child population under 15 in England and Wales have been injected with diphtheria prophylactic—some of it, unfortunately, of low potency. In the fresh drive now being started the Ministry aims at the immunization of three out of every four children, in the belief that incidence and mortality will not fall substantially until this proportion of the child population is protected. As the circular points out, diphtheria is the most fatal disease among children between the ages of 4 and 10, and the second most fatal between the ages of 2 and 5 years. The importance of immunizing children under school age is obvious, and in time, it may be hoped, no child over the age of 1 year will go about unprotected against diphtheria. Every effort should, therefore, be made by medical men and public health authorities to see that as many children as possible are immunized before the autumn of this year. The Ministry, from its central position, will employ general methods of publicity, and this no doubt will be intensified locally through the activities of medical officers of health and those serving in their various capacities in local authority clinics. We have had a "Warship Week," a "National Savings Week," and a "War Weapons Week," and the Ministry might well start a "Diphtheria Immunization Week," stimulating competition by rewards to the most successful area. If it did nothing else, at least such a "week" would set everybody talking about diphtheria immunization, and the more it is talked about and the more familiar it becomes, the greater the likelihood of achieving success. If it would not savour too much of bribery, we would even suggest that all the children immunized in the most successful local authority area should be presented with a war savings certificate each. This would be a small item in the daily war bill.

But whatever is done in the way of Press advertising, and propaganda by circular, film, and leaflet—and here a word of praise is due to the useful activities of the Central Council for Health Education—nothing, we believe, has the same force as personal persuasion and advocacy. In this country persuasion by officials always tends to be suspect, and in the diphtheria campaign now launched we could imagine no more important element in its success than the combined efforts of the general practitioners. We know well enough that general practitioners conduct much unsolicited and unrewarded propaganda towards improving the public health, but in the rush of a crowded day's work it is natural that the advice given, and perhaps especially the timing of the advice, will vary from season to season. The important thing is that the man in the street trusts his own doctor because he knows that he puts the patient's individual welfare before all other things. We would, therefore, appeal to every general practitioner to make a special point of inquiring among the families he visits during the next three or four months whether the children of the household have been immunized or not—and then to convert the unconverted.

Some 3,000 children die of diphtheria each year. These deaths could be prevented. Some 50,000 to 60,000 fall sick each year, with all the personal distress, dislocation of family life, and waste of communal effort that this means. As the experience of other countries teaches us, this could be prevented. Last week Sir Wilson Jameson referred to the successful immunization campaign carried out in Scotland. Among the 766,000 children immunized there was only one death from diphtheria in 1941; among the 389,000 not immunized there were 418 deaths. This recent illustration provides a highly effective answer to those laymen who, from whatever motives, question the value of immunization. Human beings cannot be marshalled into neat, controlled groups in the same dispassionate way as the experimentalist can assemble his guinea-pigs and rats, though it may be of interest to recall that something like this was achieved in the early days of antityphoid vaccine. When the favourable results became available in the Army in India, the Typhoid Committee hoped that the volunteers for vaccination would increase until about half of the military units would be vaccinated, leaving the other half as a control group. This attempt to suspend scientific judgment was nearly upset by Lord Kitchener, who, when he saw the earliest records, immediately wanted to make vaccination universal, but he was restrained, and it was therefore possible to show by figures what a big advantage lay with the vaccinated group. Some of the most obvious and familiar examples of the efficacy of diphtheria immunization are obtained in fever hospitals. For example, in the Birmingham Fever Hospital, among the nursing and domestic staff up to 1923 there were about 20 to 30 cases of diphtheria yearly. Active immunization of nurses and staff was carried out in 1923-5, and since 1924 the annual number of cases has ranged from 0 to 2—at a time when the admissions of cases have been rising. We know from experience that an outbreak of diphtheria can be stopped in an institution by giving antitoxin to all those exposed, and we know, too, that active immunization with modern, reliable prophylactics produces antitoxin in the body. A bald summary of the evidence is available in "Topley and Wilson," to the latter of whom and his co-workers we have during the past few months been indebted for their most valuable researches published in these columns. Much useful evidence on the efficacy of prophylaxis, for those who wish to sharpen their polemical weapons, is available in Graham Forbes's book, *Diphtheria: Its Distribution and Prevention*. Notwithstanding the shortage of paper, the Ministry of Health might well consider compiling a short pamphlet giving the factual evidence on behalf of diphtheria immunization, and perhaps even simple answers to the familiar type of question and argument used by the propagandists of anti-vivisection, who, if they had their way, would prevent the acquirement of knowledge and spread the suffering that comes through ignorance. But apart from this, the public has a right to be informed of the evidence, and must not be expected to accept diphtheria prophylaxis merely "because the doctor says so."

THE SENILE ENDOMETRIUM

Few aspects of gynaecology have aroused more interest of late than the study of physiological and pathological changes in the endometrium. The discovery that the condition so long described as glandular endometritis was in reality but a stage in the normal monthly evolution of the endometrium was followed by rapid advances. The importance of an endometrial biopsy in the investigation of sterility, and the relationship of histological patterns to prognosis in cases of irregular bleeding of hormonal origin, are two illustrations of the practical application of this increasing knowledge. To-day the conventional belief is still that endometrial activity ceases at the menopause. It is common experience that in a small proportion of cases of

post-menopausal bleeding exploration of the uterus reveals either an endometrial adenomatous polyp or an apparently rejuvenated and oestrinized type of endometrium, and it would appear reasonable in these circumstances to assume a cause-and-effect relationship. No satisfactory reason has been forthcoming to explain why these endometrial changes occur. A temporary ovarian rejuvenation and the presence of granulosa cell nests and tumours of even microscopic size have been postulated but not confirmed.

A recent paper by Novak and Richardson read at the sixty-sixth annual meeting of the American Gynecological Society[1] presented new facts to challenge the belief in a post-menopausal senile endometrium of the type hitherto regarded as normal. These two workers, who have already made valuable contributions to gynaecological histology, investigated the endometrium in 137 post-menopausal women. They found that the atrophy usually regarded as characteristic of the senile post-menopausal state was present in only 45%. The remaining 55% revealed hyperplasia, but not of a constant pattern. Forty-two, or 31% of the total series, presented a picture of proliferative activity like that seen in reproductive life. One interesting observation was that there was no correlation between the age of the patient and the histology of the endometrium. In some cases marked atrophy was present within a few months of the cessation of menstruation, while in others hyperplasia was pronounced as long as thirty or forty years after, even in one instance at the advanced age of 87. The remaining 24% of the series presented a picture which Novak and Richardson describe as being a retrogressed hyperplasia. It is characterized by the typical "Swiss cheese" pattern of excessive oestrogen stimulation, but with the difference that the stroma is fibrosed and the epithelium often atrophic. They believed that this regression rather than inflammation is the commonest explanation of the cystic gland distension so often seen in the senile endometrium, and that when this picture is found it is evidence that the menopause was preceded by a spell of anovulatory bleeding. Correlating these findings with the clinical picture they found that, excluding cases of carcinoma, of which there were 10 in the series, bleeding occurred in 47% of the senile group, 52% of the proliferative, and 24% of the regressive; obviously no one explanation will suffice to account for this. Now that attention has been focused on the post-menopausal endometrium further data will be collected quickly and questions as yet unanswered may be solved. One of the most important of these is the relative incidence of endometrial carcinoma in the three groups, with the possible influence the knowledge of this would have on the treatment of irregular haemorrhage of the menopause.

ADRENALINE BRONCHOCONSTRICTION

Daly and his colleagues[2] in Edinburgh have recently described an interesting investigation in which they show that in certain conditions adrenaline has an effect on the bronchioles opposite to that usually produced, so that bronchoconstriction follows. Some asthmatic patients are known to develop an attack when exposed to a sudden emotional stimulus or when beginning exercise—that is to say, at times when adrenaline may be presumed to be liberated and, according to accepted ideas of its action, to dilate the bronchioles. The experimental observation that in some circumstances adrenaline does not dilate but actually constricts the bronchioles promises to harmonize the clinical observation with physiological knowledge very satisfactorily. The experimental methods used require a high standard of skill. In this investigation the results have been obtained not merely by perfusing the lungs but by means of a preparation in which the right and left lungs of a dog were separately perfused, with the use of defibrinated or heparinized blood. In earlier observations Daly, Mark, and Petrovskaia[3] had found that injection of adrenaline into the blood going to the pulmonary artery produced bronchoconstriction when posterior pituitary extract was injected first. The present work shows that this preliminary administration is unnecessary, and that adrenaline produces bronchoconstriction if the lungs are perfused for two hours with blood from which adrenaline is absent. That is to say, the prerequisite for observing this paradoxical effect is that the lungs should have suffered from hypo-adrenalinaemia for a longish time. There is at present no attempt to explain the phenomenon. The bronchoconstrictor action of adrenaline does not necessarily persist, and just as the asthmatic precipitated into asthma by an emotional stimulus can be rescued by a later injection of adrenaline, so the bronchoconstrictor response of the isolated perfused lung to adrenaline may be followed later by the more usual bronchodilator response.

DEMYELINATION

A comprehensive definition of those diseases of the nervous system in which demyelination is predominant is not as easy as might at first be thought. Disseminated or multiple sclerosis is a classical example of such a disease, but in some demyelinating affections the axis cylinders suffer as much as their myelin sheaths, and it is not possible to state categorically that the myelin has been affected primarily. In the absence of precise knowledge of the aetiology of the many varieties of demyelinating conditions to which names have been attached by various authors, it cannot be certain that details of distribution of the lesions and of the minutiae of the histological picture really possess the significance so often attached to them by the neuropathologist. It may be, as E. Weston Hurst[4] has brought out in the first Rennie lecture before the Royal Australasian College of Physicians in September last, extremely difficult to classify any particular case into one of the many clinicopathological syndromes which have been described. Thus Schilder's disease may show plaques in the cord hardly distinguishable from the more acute manifestations of multiple sclerosis. Weston Hurst points out that demyelinating diseases are by no means limited to man. Disseminated encephalomyelitis of dogs is of frequent occurrence in South Australia, and a malady resembling Schilder's disease has been described in apes, monkeys, and lemurs. "Swayback" in lambs is characterized by diffuse symmetrical demyelination in the cerebral hemispheres, and may be a copper-deficiency disease, at least in Australia. Other demyelinating diseases are recorded in horses and in the North American moose, which as the result may lose its customary fear of man and be easily caught. The precise aetiology of none of these demyelinating diseases is understood. Their pathogenesis has been ascribed to vitamin or other deficiency factor, toxins, various organisms, and inevitably anaphylaxis: we do not even know whether the problem of demyelination is related to one or several causes. Demyelination has followed vaccination, spinal analgesia, burns, the administration of substances such as arsphenamine and sulphanilamide, and the inhalation of carbon monoxide. Weston Hurst has experimentally induced demyelination with potassium cyanide and sodium azide, and has noted the close

1 *Amer. J. Obstet. Gynec.*, 1941, **42**, 564.
2 *Quart. J. exp. Physiol.*, 1941, **31**, 129.
3 *J. Physiol.*, 1937, **89**, 26 P.
4 *Med. J. Austral.*, 1941, **2**, 661.

relation between the circumstances leading to bilateral necrosis of the basal ganglia and those leading to demyelination. The white matter would appear to have a relatively poor recuperative power, because repeated small doses of cyanide, which is not a cumulative poison in the pharmacological sense but is rapidly detoxicated in the animal, does result in demyelination. Weston Hurst points out that we are still far from solving the nature of disseminated sclerosis and other demyelinating diseases, but laboratory work may in the end throw light on it. This first Rennie lecture will be memorable for both its clarity and its scope in dealing with a difficult and obscure subject, and not the least of its attractive features is the comprehensive bibliography which the distinguished lecturer has appended to the report of his address.

WANTED—STANDARD GUINEA-PIGS

At the meeting of the Pathological Society held in Cambridge on March 20, a paper by P. Hartley on the response of different strains of guinea-pigs to the same immunizing procedure aroused exceptional interest and prolonged discussion. The circumstances of this experiment were that parallel tests of a batch of diphtheria formol toxoid had been arranged in Copenhagen, Frankfort, and London. Large numbers of guinea-pigs having been given a certain dose of this material, its immunizing effect was to be judged by a later injection of toxin, the dose being so adjusted that only a proportion of the animals was expected to survive. Whereas in fact a substantial proportion of the guinea-pigs used in Copenhagen and Frankfort succumbed, the mortality among the numerous animals used by Hartley was almost *nil*, not only in the first test but in experiments repeated at different times of year. These guinea-pigs were of a strain which has been selected and bred by the Medical Research Council for experimental purposes: the stock has been maintained free from disease, and care has naturally been taken over adequate feeding. In particular they are given green vegetables all the year round, whereas it proved on inquiry that the Frankfort guinea-pigs had been fed on mangolds. This and subsequent experiments made it clear that a well-fed guinea-pig of healthy stock responds better to immunizing procedures than a nondescript animal for which these advantages cannot be claimed, although by ordinary criteria the two may presumably be indistinguishable. It follows that tests of antigenicity are liable to give very variable results unless the animal itself can be more or less standardized. There are indeed other purposes for which animals are necessary in which a reasonable degree of homogeneity in the stock used is clearly desirable. Some of the larger laboratories breed their own stocks and are therefore in a position to secure this advantage, at least in so far as freedom from epizootics and adequate feeding can do so. Others have to rely on dealers, few of whom are qualified or equipped to produce anything more than an animal up to a certain standard of weight and in apparently good condition. While this position has grave disadvantages at any time, it is made worse at present by the shortage of feeding stuffs, which has reduced the supply of animals and compelled laboratories to buy from any source they can find. The opinion was strongly expressed at this meeting that steps should be taken so that all laboratories needing them may have access to a supply of reliable animals. A national experimental animal farm supplying stocks not only healthy but of well-ascertained characters in relation to the purposes for which they are to be used is the obvious solution to this problem: it should be neither difficult to establish nor unprofitable to maintain.

ARGENTINE BACTERIOLOGICAL INSTITUTE

A special number of the *Revista del Instituto Bacteriológico del Departamento Nacional de Higiene* celebrates the 25th anniversary of the foundation of the Bacteriological Institute at Buenos Aires. Its first Director was Prof. R. Kraus, who later occupied similar positions in the Butantan Institute of Brazil and in the Bacteriological Institute at Santiago de Chile. The present Director, the well-known Prof. Alfredo Sordelli, has held office since 1924. In this special issue of the official publication of the Institute an impressive picture is presented of its multiple activities, which may be classified under four main headings: (1) the manufacture of biological products—vaccines, sera, insulin and other hormones; (2) the control of biological and other medical products and apparatus submitted for acceptance to the National Health Department; (3) the diagnosis and study of communicable diseases; (4) scientific research. The total value of the Institute's products distributed in 1940 amounted to nearly £500,000, of which all but a small fraction was disposed of free of charge to health services and hospitals. The general expenses of the Institute for the same year were approximately £25,000, most of which was recovered by sales. Communicable diseases which have been made the objects of special study are brucellosis, enteric fevers, influenza, sylvatic plague, psittacosis, typhus, Chagas's disease, uncinariosis, and leptospirosis icterohaemorrhagica. In 1938 the Institute was chosen by the League of Nations as the South American depository for biological standards. At the 2nd International Congress of Microbiology at New York in 1939 it was resolved that an Inter-American Society of Microbiology should be founded, and Prof. Sordelli was appointed its first president. The new Society met for the first time at the Bacteriological Institute in Buenos Aires in April, 1940.

Approximately 700 papers have been published from the Institute during its 25 years, and most of them are to be found in *Folia Biológica, Revista de la Sociedad de Biología, La Semana Médica, La Prensa Médica Argentina, Revista de la Asociación Química Argentina*, as well as in the Institute's own organ. In addition, a number of papers have been published abroad, particularly in *Comptes rendus de la Société de Biologie*. Even the foregoing brief and necessarily superficial survey of the contents of this special number can leave no room for doubt as to the scientific and social importance of this Argentine Institute, which may be compared in regard to some of its activities with our National Institute for Medical Research and Lister Institute, although its scope is evidently far more comprehensive than that of either of these two bodies. Its foundation was due largely to the initiative of Dr. Carlos G. Malbrán, and authority has recently been sought to name the Institute after him and to erect a bust in his memory on the occasion of its 25th anniversary.

News has been received from Montreal of the death of T. B. Macaulay, LL.D., formerly President of the Sun Life Assurance Company of Canada, who made a gift of £30,000 to the Animal Breeding Research Department of Edinburgh University, and founded the Macaulay Institute for Soil Research at Aberdeen. When the British Medical Association held its Annual Meeting at Winnipeg in 1930 in conjunction with the Canadian Medical Association Dr. Macaulay was elected an Honorary Member of the B.M.A. in recognition of the time, thought, and money he had given to the promotion of medical education, and especially to the development of postgraduate opportunities for the study of tuberculosis.

VITAMIN C IN FRUIT PREPARATIONS

BY

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In this laboratory we have estimated the concentration of vitamin C in sixteen preparations of fruit juices, purées, etc., made at home or in the factory. The method was the usual one of measuring the amount of the preparation (suitably diluted with water) necessary to decolorize completely a measured amount of dichlorophenol-indophenol. Tablets of this dye, of standard weight, prepared by Messrs. Roche Products, were dissolved in measured amounts of water, and the solution was stoppered, kept in the cold room, and used within forty-eight hours. Ten per cent. of glacial acetic acid was added to the fruit preparation or to the dye, so that the titration was done with the dye in the acid state. The colour of diluted black-currant juice or purée was the same as that of the acid dye, and to obtain a good end-point the blackcurrant preparation was added in alternate drops from the burette to two tubes, one of which contained the acidified dye and the other an equal amount of acidified distilled water. The magenta colour decreased in the first and increased in the second until the degrees were equal. Each titration was made in two minutes, and after preliminary tests a dilution of the preparation was used which required 1 to 3.5 c.cm. to decolorize the dye. Titrations were done in triplicate.

Recently Meiklejohn and Stewart (*Biochem. J.*, 1941, **35**, 761) described a more accurate method of measuring ascorbic acid in foods, but Dr. C. P. Stewart has informed me that his "results suggest that usually there is no gross error in determining the ascorbic acid content of foodstuffs by direct indophenol titration."

The material which contained the highest concentration (2.2 mg. per c.cm.) of vitamin C was a rose-hip syrup (No. 1) tested a few days after it was made by Mrs. Leyland, matron of Islington Institution, from the following recipe:

> Take 4 lb. rose-hips and 2¼ lb. sugar. Wash rose-hips and put in an enamelled pan. Cover with water and bring to the boil. Simmer gently for ten minutes or until tender. Mash with a wooden spoon. Put into a jelly-bag and squeeze out as much juice as possible. Return pulp to the pan and add as much water as at first. Bring to the boil and again simmer. Put back into a jelly-bag and squeeze again. Mix the two lots of juice and put into a clean jelly-bag. Allow to drip all night. Boil down the juice until there is about 2 pints left. Add the sugar in the above proportions. Stir until dissolved; boil rapidly for seven minutes. Bottle while hot in sterilized bottles. Seal at once. Store in a dark cupboard. If possible use a clean jelly-bag for each straining. The fluid should be quite clear.

The following list gives the concentrations of the vitamin found when the containers were first opened:

Rose-hip syrup, No. 1	2·2 mg. per c.cm.
,, ,, No. 2	1·0 ,, ,, ,,
,, ,, No. 3	0·4 ,, ,, ,,
Blackcurrant purée, No. 1	1·0 ,, ,, ,,
,, ,, No. 2: "official"	0·66 ,, ,, ,,
,, syrup: "official"	0·63 ,, ,, ,,
,, juice (tinned)	0·6 ,, ,, ,,
Orange juice, fresh	0·66 ,, ,, ,,
,, ,, tinned	0·4 ,, ,, ,,
Lemon ,, ,,	0·4 ,, ,, ,,
Lime ,, bottled	0·1 ,, ,, ,,
Tomato ,, tinned	0·08 ,, ,, ,,
Orange squash, bottled	0·07 ,, ,, ,,
Grape-fruit squash, bottled, No. 1	0·05 ,, ,, ,,
,, ,, ,, No. 2	0·04 ,, ,, ,,
Tomato juice, home-made	0·02 ,, ,, ,,

The three specimens of rose-hip juice were made by the same person from the same recipe, and factors in the different results might be variations in the amount of concentration by boiling and the fact that rose-hips differ in the concentration of vitamin C according to the situation of their growth and the degree of ripeness when they are pulled. The hips for the third preparation were pulled in January, when they were far past their best condition. The two preparations of blackcurrant purée were made by the same firm. No. 2 was from a tin prepared for free distribution at welfare clinics; the concentration of vitamin C was arranged at the request of the Ministry of Food to be approximately equal to that of orange juice, and it was found to be so. The blackcurrant syrup also is from a bottle prepared for free distribution. Tinned orange juice and tinned lemon juice were found to have good concentrations of the vitamin; but lime juice, tomato juice, orange squash, and grape-fruit squash had very little of it.

The preservation of the vitamin was observed in some circumstances. The vitamin is not lost to the extent that was at one time thought when the preparations are heated or stored. Rose-hip syrup No. 1 and tinned orange juice were placed in vessels surrounded by boiling water for two hours, and after the loss by evaporation was made up by the addition of water it was found that the reduction of vitamin C was from 2 to 1.66 mg. per c.cm. in the first and from 0.4 to 0.2 mg. in the second. The corresponding figures for tinned blackcurrant juice were 0.6 when the tin was opened and 0.4 after it had been cooked in a tart. When blackcurrant purée in airtight tins was tested several months to two or three years after preparation it was found to have the concentration of the vitamin at which the makers had aimed.

Certain specimens of rose-hip syrup—Nos. 1 and 2—were found to have maintained the vitamin content quite well for three months in well-sealed glass jars, since their loss was from 2.2 mg. to 1.8 mg. per c.cm. and 1.0 to 0.8 mg. respectively. Another specimen of syrup No. 2 showed a loss in one month from 1.0 mg. to 0.7; but two months later the concentration in this bottle was the same, and after it had been placed in boiling water for 1½ hours the amount was 0.65 mg., so that the content of vitamin had become comparatively stabilized.

It will often happen that the contents of a tin of purée will not be finished for some days or a week or two after the tin has been opened. For this reason the concentration of vitamin was estimated when a tin was opened and after portions of the contents had been kept for one or two weeks in glass bottles and in different circumstances, as shown in the following table:

	Vitamin C per c.cm.	Vitamin C per c.cm. after restoring Water Loss, if any
At time of opening tin	0·66 mg.	0·66 mg.
Kept in air 1 week	0·66 ,,	0·64 ,,
,, ,, ,, 2 weeks	0·66 ,,	0·54 ,,
,, ,, vacuum jar 1 week	0·66 ,,	0·66 ,,
,, ,, ,, ,, 2 weeks	0·64 ,,	0·60 ,,
,, under paraffin oil 1 week	0·63 ,,	0·63 ,,
,, ,, ,, ,, 2 weeks	0·64 ,,	0·64 ,,
,, in air with 1% glucose 1 week	0·64 mg.	0·60 ,,
,, ,, ,, ,, ,, 2 weeks	0·64 ,,	0·55 ,,

From the second column (which is calculated from the observed figures of the first column and from the amount of evaporation that had occurred) it is seen that vitamin was lost when the purée was left in contact with the atmosphere (whether 1% glucose was added or not), and to a smaller extent when it was kept in a jar from which air was exhausted sufficiently to decolorize methylene blue in the usual indicator for anaerobiosis. The losses were of 15% or less. Under a layer of about 1 cm. of paraffin oil no loss occurred. In the two portions kept in air, evaporation occurred, and when the same volumes before and after evaporation are considered, the concentration of the purée thus caused almost compensated for the loss of vitamin. These tests were made in winter-time; in the warmer weather evaporation might concentrate the purée faster than the decrease of vitamin concentration occurred.

It would appear, therefore, that the vitamin is likely to remain comparatively stable in blackcurrant purée and rose-hip syrup if these are kept in tins or bottles which are air-tight and contain the minimum residual air.

I have to thank Mr. P. Shackcloth for enthusiastic assistance in these estimations.

CENTRAL MIDWIVES BOARD FOR SCOTLAND

At the last meeting of the Central Midwives Board for Scotland Prof. R. W. Johnstone, C.B.E., M.D., F.R.C.S.Ed., F.R.C.O.G., and Prof. James Hendry, M.B.E., M.B., F.R.F.P.& S.G., F.R.C.O.G., were elected chairman and deputy chairman respectively for the ensuing year. Examiners were appointed and institutions were approved for the training of pupil midwives.

Nova et Vetera

A PIONEER OF OPEN-AIR TREATMENT

HENRY MacCORMAC (1800-86)

At some future time the curious or enterprising may discover in the medical almanacs and directories of an earlier age a rich unworked vein of forgotten history. Thus in the *Medical Annual or British Medical Almanac* for 1839 there is printed on page 99 a notice announcing that the session of the Royal Belfast Institution Medical School commences on Nov. 1, and that Dr. MacCormac lectures on the Practice of Physic at 7 o'clock p.m.

A Break from Tradition

This introduces a remarkable personage, who, despite opposition from nearly every quarter, continued to be the most persistent advocate of pure fresh untainted air at all times and in all places, a break from tradition at a time when the night air was considered almost a deadly poison; when red sandbags lay on every window-sash to exclude the least attempt at ventilation; and when the atmosphere of the curtained sick-chamber, with its roaring fire, was, by design, foul and contaminated to a degree.

In an address on the British Pioneers in the Modern Treatment of Tuberculosis, Sir Humphry Rolleston* places George Boddington first and Henry MacCormac second as among the pioneer-protagonists of the open-air treatment of tuberculosis. But, unlike Boddington, MacCormac constantly refused to be discouraged by the neglect and antagonism of his British colleagues, and continued to proclaim in books, pamphlets, and addresses that there can be no immunity from the twofold scourges of phthisis and scrofula until medical practice and popular conviction alike concur as to the indispensableness of fresh air. His views were freely criticized, as when, in a communication to the Royal Medical and Chirurgical Society of London, he affirmed that consumption and scrofula were purely artificial and entirely avoidable, and that the air by day, and assuredly by night, should be as pure as that which traverses the hill-tops. A Dr. Chambers characterized the reading of the paper as a waste of time, and a Mr. Ashton concluded that the Society refused to pass a vote of thanks. More than 20 years later MacCormac published an open letter on "The Air Cure of Tubercular Consumption as conducted at Davos and the Engadine" addressed to the "Medico-Chirurgical," reminding them of their verdict, and calling upon the Society to acknowledge that his contention had now been proved correct. But all was not to fall on stony ground. The major treatise *Consumption* achieved a second edition and was translated into German and Dutch, contributing no doubt to the highly organized sanatorium treatment as established in Germany.

Although MacCormac's theory of the genesis of tuberculosis cannot now be sustained, the burning fire of a more subtle and penetrating conviction led him, out of and before his time, ceaselessly to preach his revolutionary doctrine. "If I had a Stentor's voice, an angel's pen," he wrote, "I should employ them to enlarge my views, which with the very firmest convictions I believe to embody the safety and material healing of our kind." And he had other and more practical resources; for if patients proved obstinate he procured ventilation by poking his umbrella through the window-pane, a practice which on one occasion led to his appearance in the police court.

Other Medical Preoccupations

Consumption if his chief was not his only preoccupation. The list of his numerous publications includes a *Treatise on the Cause and Cure of Stammering* (1828); and an *Exposition of the Nature, Treatment and Prevention of Continued Fever* (1835), in which he thus prophetically expresses himself: "Is it not extraordinary that no Ministry of Health exists of which medical men should form a part? If the community had the same faith in the prevention as in the saving power of medicine, and it surely merits at least equal confidence, such a foundation as the above would soon be called into existence."

His appointment as visiting physician to the Belfast Asylum inspired a pamphlet, "Metanoia: A Plea for the Insane" (1861), wherein he states that insanity is not a disease of the brain substance, but that "the evil lies in quite other than empirical considerations, resides in the mind's unconsciousness of its consciousness—in a word, the soul's unawareness of its own acts," an anticipatory echo of Freud and later psychology. (Sir H. Rolleston.)

The following, abstracted from the introduction to *Consumption*, possesses a historic interest:

"When I was a pupil under Dupuytren at the Hôtel-Dieu in Paris the atmosphere then, as now, was simply infamous; tubercle and tubercle-induced degeneration met you in that vast retreat of human suffering and decay at every turn. In the mornings, and indeed throughout the day, one could hear the cries of those who were undergoing the terrible infliction of the moxa; the foul incense of burning flesh polluted yet further the sickly foetid atmosphere."

His Sympathy for the Sick

Throughout his writings and his living MacCormac continued to reveal a profound sympathy for the sick and a fierce indignation at the appalling conditions in which the lower classes were compelled to live and die. Of this he gave practical effect by setting aside two hours daily for free consultation at his house, only asking of those who came that they should be poor and ill. His plea for "The Painless Extinction of Life for Animals designed for Human Food," published in 1864, is evidence of his horror of unnecessary pain, a plea which nevertheless found no effective response until 70 years had passed, when Parliament enacted that the knife and the pole-axe should be replaced by a procedure less barbarous.

MacCormac's brother John emigrated to Sierra Leone, where, as Chief Magistrate and a Member of the Legislative Council, he lived for 50 years. This may account for an exploit remarkable at any time, the more so in the year 1824; for, on the authority of the *Dictionary of National Biography*, the subject of this memoir, after visiting the Cape of Good Hope, went to Sierra Leone by land, incidentally nearly succumbing to an attack of jungle fever on the way.

It may also be recorded as of some interest that MacCormac's eldest son became surgeon to St. Thomas's Hospital and President of the Royal College of Surgeons of England.

Canad. med. Ass. J., 1933, **29**, 113.

FIFTH ADDENDUM TO THE BRITISH PHARMACOPOEIA

The General Medical Council will publish shortly a Fifth Addendum to the *British Pharmacopoeia, 1932*, in which certain new monographs and modifications of existing monographs will be included. Under normal conditions, when a new *Pharmacopoeia* or an Addendum to a *Pharmacopoeia* has been ready for publication, it has been customary to give facilities for advance copies to be inspected, during the three months immediately preceding publication, by medical practitioners, pharmacists, analysts, manufacturers, and others who may be interested. The Fifth Addendum to the *British Pharmacopoeia, 1932*, like the Second, Third, and Fourth Addenda, has been prepared to deal with conditions arising from the present emergency, and it is expedient that it should be published, and thus made official, without delay. It is not possible, therefore, to provide for the preliminary inspection of the completed Addendum.

The following new monographs will be included:

Emulsio Chloroformi
Emulsio Menthae Piperitae
Extractum Quillaiae Liquidum
Extractum Scillae Liquidum
Liquor Aethylis Nitritis Concentratus
Liquor Ammoniae Aromaticus
Tincturae Concentratae
Tinctura Aurantii Concentrata
Tinctura Capsici Concentrata
Tinctura Cardamomi Composita Concentrata
Tinctura Cinchonae Composita Concentrata
Tinctura Gentianae Composita Concentrata
Tinctura Limonis Concentrata
Tinctura Lobeliae Aetherea Concentrata
Tinctura Opii Camphorata Concentrata
Tinctura Quassiae Concentrata
Tinctura Tolutana Concentrata
Tinctura Valerianae Ammoniata Concentrata

The Addendum will contain, in addition, an amendment to the *British Pharmacopoeia, 1932*, which became official by virtue of notices in the London, Edinburgh, Belfast, and Dublin *Gazettes* of March 20, 1942:

Extractum Malti

and emendations to the following monographs, which will become official on the date of publication of the Fifth Addendum:

Belladonna Pulverata	Linimentum Belladonnae
Belladonnae Folium	Menthol
Belladonnae Radix	Mepacrinae Methanosulphonas
Digoxinum	Syrupus Aurantii
Extractum Belladonnae Liquidum	Tinctura Belladonnae
Extractum Filicis	

The Addendum will contain also revised appendices relevant to the monographs named above and a Cumulative Index to the five Addenda to the *British Pharmacopoeia, 1932*.

It must be understood that no additional monograph or emendation of a monograph is official until the Fifth Addendum has been published.

Reports of Societies

ABDOMINAL HYSTERECTOMY

At the last meeting of the Section of Obstetrics of the Royal Academy of Medicine in Ireland, with the president, Dr. NINIAN FALKINER, in the chair, Dr. BETHEL SOLOMONS read a paper dealing with 790 cases of abdominal hysterectomy, and showed a coloured film of total hysterectomy. Both the total and the subtotal operations had been performed. There were, he said, few indications for the vaginal route. It was far more important that the gynaecologist should know when a hysterectomy was indicated than that he should know which variety to do. From answers to a questionary it seemed of little importance whether the ovaries were conserved. (His technique was described in *Surgery, Gynecology and Obstetrics* of October, 1940.) There were 17 deaths in 790 operations—a mortality rate of 2.16%. At least 4 of the hysterectomy deaths were due to extra-uterine conditions, so the corrected mortality rate was 13, or 1.6%. Although spinal anaesthesia gave wonderful relaxation he thought a general anaesthetic was safer. Success could not be achieved without a good assistant and skilled nursing both in the theatre and in the convalescent period.

The PRESIDENT asked if this series included cases of hysterectomy performed for carcinoma of the cervix. The low incidence of malignancy in Dr. Solomons's cases was remarkable, as was also the fact that there were 12 tuberculous cases.

Prof. A. H. DAVIDSON said that the film showed Dr. Solomons's technique beautifully. It was possible from the film to follow the operation from beginning to end. Unless there was definite sepsis in the abdomen, he did not think that there was any necessity to leave either a plug of gauze or a drain in. He was strongly of opinion that Dr. Solomons should not be allowed "to get away with" the fact that in 798 cases he had found not one single case in which vaginal hysterectomy was indicated. In his opinion vaginal hysterectomy had a place in obstetrics. American workers were now coming to prefer vaginal to abdominal hysterectomy in cases in which it could be done. He had found that women who had had the ovaries removed had the menopause earlier than those who had not, and perhaps slightly more severely. In the last year and a half he had seen four women in hospital who had come back after abdominal hysterectomy complaining of severe pain in the pelvis. In these cases there was cystic degeneration of the ovaries, which had been left behind. The ovaries, when left behind, quite often became cystic. A number of American authorities had shown recently that the incidence of carcinoma of the cervix in cases of retained cervical stump was 2% or 3%. He personally had not done a subtotal hysterectomy for five or six years, because he believed that if the cervix was left behind it was very liable to give trouble.

Dr. J. F. CUNNINGHAM asked Dr. Solomons why he did the subtotal operation so frequently: the complications after this were more numerous than after total hysterectomy. Dr. R. M. CORBET supported Prof. Davidson's plea for vaginal hysterectomy. It was possible to do this operation under local anaesthesia. American obstetricians were very ready to do a vaginal hysterectomy, but seemed to be reluctant to do the total operation. This fact might perhaps account for the incidence of cervical carcinoma in America. In Ireland the incidence of cervical carcinoma and of stump carcinoma was lower than it was in the U.S.A. Dr. J. S. QUIN believed that subtotal hysterectomy was never justified. The trouble in most cases started six months after operation. This showed that the cervix had not been examined as carefully as it should have been during the operation. Dr. J. G. GALLAGHER said that in Dr. Solomons's series only 14 operations had been done for malignancy of the body of the uterus. This fact would suggest that most of the operations had been done for relatively simple conditions. About 40% of patients had not replied to the questionary which Dr. Solomons had sent out. The reason for this might perhaps have been that they were dissatisfied with the operation.

The MASTER of the National Maternity Hospital said that it was his custom not to remove the ovaries if he could avoid doing so. In the cases in which he had removed them a considerable number of the women had suffered from very severe menopausal symptoms. Dr. A. P. BARRY said that he would never perform a total hysterectomy unless it was absolutely indicated, as it was an operation which led to the occurrence of bladder symptoms afterwards.

Dr. BETHEL SOLOMONS, in reply, said that cases of cervical carcinoma were not included. He believed that tuberculosis of the uterus was more common than was realized, and there were 12 in the series; some of these were in cases of hysterectomy associated with tuberculosis of the tubes. If an operation could be deferred until the sedimentation rate was slow, infection was less likely and thrombosis less probable. He pointed out that the title of his paper was "Abdominal Hysterectomy"; he had done vaginal hysterectomies, but they should be reserved for those cases in which a vaginal repair was necessary in addition to the removal of the uterus. With his technique there was less shock after the abdominal operation, and he preferred that route to the vaginal. In the series there were 352 subtotal operations and 438 total. In recent years he had been more inclined to perform the total operation, but there was no danger of malignant disease in the stump after the subtotal operation if great care were taken in the selection of cases. If the ovaries were cystic he removed them. There were only two cases in the series in which intractable sciatica had been cured by the removal of large tumours.

Correspondence

Wanted: Anti-Rh Sera

SIR,—Recently an annotation in the *British Medical Journal* and abstracts in the *Bulletin of War Medicine* have drawn attention to the role of the newly discovered blood-group antigen Rh in the iso-immunization of man. In these articles and in the original papers on the subject the impression is given that the Rh antibody in man is never easy to detect. It may be of interest to others who are looking for the antibody in human sera to record that we have lately examined sera giving easily detectable clear-cut reactions at room temperature; at 37° C. the reactions were even better. The tests were made in small precipitin tubes in which were placed equal volumes of serum and red-cell suspension (about 4% of whole blood). When reading the reactions after two hours the tubes were tapped gently, and in many cases agglutinates were visible to the naked eye, whilst other reactions could be seen under the microscope. Rough treatment of the mixtures of cells and serum should be avoided, as it may cause agglutinates to be broken up and false negatives recorded. All the sera have come from the mothers of babies suffering from icterus gravis neonatorum. It seems likely that if a large series of such sera were to be examined several would be found to contain potent anti-Rh agglutinins.

Since it is desirable to procure adequate supplies of anti-Rh sera we should be grateful if doctors would send us a sample of blood from any mother who has recently given birth to a baby suffering from any form of erythroblastosis foetalis. We should also be very glad to receive sera from persons who have had unexplained *haemolytic* transfusion reactions. A sample of, say, 5 to 10 c.cm. of whole blood in a sterile container without the addition of anticoagulant would serve in the first place, and if examination showed that the serum was likely

to be a good reagent more blood could be asked for. In the case of haemolytic transfusion reactions a sample of donor blood should also be sent if possible, and in all cases we should be grateful for brief clinical notes. It is suggested that samples obtained in the London area (including sector hospitals) should be sent to Sutton and all others to Cambridge.—We are, etc.,

P. L. MOLLISON,
G.P.O., Sutton, Surrey.
G. L. TAYLOR,
Galton Laboratory,
Department of Pathology, Cambridge.

Mortality in Lobar Pneumonia

SIR,—I should be indeed sorry to shake Major Hutchison's faith and confidence in any therapeutic procedure, especially one which accompanied—if it was not responsible for—a recovery rate of 100% in the case of 41 patients with lobar pneumonia. But I feel bound to point out to him that he is not justified in maintaining that "this represents a great advance on results possible in pre-chemotherapy days" (April 18, p. 488).

During the last war a series of 558 cases of lobar pneumonia (*Lancet*, 1920, **2**, 543) which I treated in military hospitals during two and a half years included at one period 53 consecutive cases without a death, followed after one fatality by another 40 consecutive recoveries. On several occasions during the years that have since elapsed I have thought it desirable to draw attention to these figures when certain treatments have been recorded with spectacular results as evidence or proof of specificity, adding that had any special or peculiar measure been adopted in my series it would have been irresistible to allocate to it the credit for the exceptionally high recovery rate. Yet, apart from purely symptomatic measures, no treatment of any kind was undertaken.

It is in no spirit of carping criticism, of obstructiveness, or of inaccessibility to new ideas that I write once more. The opportunity to investigate on the large scale essential to accurate conclusions is not likely ever again to fall to my lot, and I look to the present generation to instruct me through their investigations as to the indications and value of modern methods of treatment. I am well aware that some very striking figures are already to hand, but pneumonia is a self-limited disease whose mortality rate depends upon several factors, all subject to great variability. And although Major Hutchison is rightly satisfied at the opportunity of recording 100% successes, he will not resent my observing how caution in interpreting results will always be necessary.—I am, etc.,

London, W.1. ADOLPHE ABRAHAMS.

Management of Pulmonary Disease in the Forces

SIR,—I hope that Major J. H. Hutchison's excellent paper on pulmonary disease in the Forces (April 18, p. 487) will be carefully studied and digested by the Navy, Army, and R.A.F. M.O.s concerned. He says: ". . . to diagnose the presence of active tuberculosis when it is in fact absent is almost as serious a mistake as to miss its presence or to fail to investigate the possibility when it arises. . . ." This is very true, and yet this mistake is being made all too frequently.

To illustrate the point I should like to repeat here some observations I made recently before the Yorkshire Tuberculosis Society. Of 23 men discharged from the Forces with "active pulmonary tuberculosis" and referred to 4 tuberculosis dispensaries in this area since the outbreak of war, only 10 could be accepted without reservations. Eleven were kept under observation, 1 of them was discharged as non-tuberculous after 8 months, 2 were lost sight of after 2 and 18 months' observation respectively, during which time there was no definite evidence of active tuberculosis after the clearing up of a sterile pleural effusion, and 8 are still under observation. The remaining 2 patients proved to be suffering from spinal and rib tuberculosis respectively, without any lung involvement.

I am inclined to believe that some of the doubtful cases belong to Major Hutchison's categories of "pneumonitis" and "atypical pneumonia," and were diagnosed as tuberculosis only because it is not always recognized that, to quote Major Hutchison again, ". . . in many cases ultimate diagnosis must await the benign course of the illness and complete disappearance of the *x*-ray shadows characteristic of 'pneumonitis.' The diagnosis will be particularly difficult in the initial stages when the localized *x*-ray opacity is in the upper zone of a lung."

What can be done to remedy the position? Major Hutchison says the soldier should be referred to a medical specialist when active disease is suspected. Yes, but this has been done in nearly all the cases mentioned. Every military unit cannot be equally fortunate in having a specialist with wide experience in chest work. With all due respect to medical specialists generally, would it not be possible and useful for them to consult with a lung specialist, who in most cases would be the local tuberculosis officer? I think the latter would much rather give his advice—for what it is worth—before the patient has been labelled tuberculous than take over a number of men who are discharged from service and pensioned for pulmonary tuberculosis which has miraculously disappeared. Is it not asking too much of the tuberculosis officer to deprive a man of his pension by refusing to accept the diagnosis after the man has been definitely told that he is suffering from the disease?

I am in full agreement with what Major Hutchison says on the management of pleural effusions. I do not think it justified to discharge all these cases indiscriminately from the Forces if all they require is "a period of regulated living, fresh air, good food, and periodic medical observation; such is supplied to the full by service in the Army in one of the lower medical categories." I am sure Major Hutchison is right in deciding to retain a higher percentage of these cases in future.

There is only one point which may be open to doubt. Is it really possible in the great majority of cases to make a definite diagnosis after 7 to 10 days in hospital? From my sanatorium days I remember a good number of patients who were extremely difficult to diagnose even after a month's close observation or more. Repeated *x*-ray examinations may be necessary at longer intervals, and among the ex-soldiers described above we have had some under dispensary observation for anything up to 18 months before definitely deciding for or against tuberculosis. The majority, however, should be clear after a month or two.—I am, etc.,

Huddersfield. W. B. LIPSCHITZ.

Detection and Treatment of Tuberculosis

SIR,—The letter of Sir Frederick Menzies (April 11) is a lucid exposition of the unwillingness of a public health administrator to face the problem of tuberculous disease. Constructive schemes for bringing the disease under control are discouraged by the suggestion that their advocates do not realize that all such schemes must entail a considerable expenditure of intelligence, hard work, and money; but little stress is laid on the heavy wastage of these commodities, the loss of man-power, and the cost in suffering and grief which result from our failure to tackle the problem.

It is nearly three years since the Tuberculosis Association recommended mass radiography of recruits; Authority declined for reasons similar to those advanced by Sir Frederick. We pointed out that the difficulties were by no means insuperable and that they would have to be faced and overcome if our medical services were to be set in order for a "total war." He advises against a scheme for detecting pulmonary tuberculosis in the early and easily curable stage because he has it "on excellent authority that ever since war broke out there has been a very serious shortage of sanatorium treatment available for patients already known to be urgently in need of treatment." This shortage is notorious, and is due to the short-sighted official policy which decreed the discharge of hundreds of tuberculous patients from sanatoria at the outbreak of war and the diversion of this accommodation to other uses. No large-scale preparation had been made for the reception of war casualties or the evacuation of hospital patients from our big cities, and this lack of foresight was repaired by the makeshift of disrupting the tuberculosis services. This disorganization not only stopped the treatment of patients in sanatoria but also led to the closing of a large number of the artificial pneumothorax clinics in London and the Home Counties. It should not be forgotten that many hundreds of patients were thus suddenly, without warning or advice, denied this vital outpatient treatment, and it was due only to the energy and initiative of the depleted staffs of the voluntary chest hospitals and of those in charge of the special departments in the great teaching hospitals that these patients were saved from disaster during the weeks which elapsed before the public tuberculosis services were able to function again and reorganize their clinics.

It would be well if such incidents were remembered by those who favour the State control of all hospitals.

This *Journal* published in 1939 eloquent protests by Prof. Lyle Cummins, the Joint Tuberculosis Council, and other responsible authorities against the emptying of the sanatoria and the diversion of their use from the treatment of the tuberculous; it was pointed out that the disease was likely to increase during this war as it had done in the last one, so that accommodation for treatment should be increased instead of being drastically reduced. This advice has not been implemented, and a heavy responsibility lies upon those who still refuse to restore the sanatoria to their appropriate use despite rising morbidity and mortality rates. We who favour mass radiography do "advocate no less strongly the very urgent need for a large extension of adequate facilities for the treatment"; and no man who is aware of the facts could do otherwise.

Sir Frederick goes on to ask: "Is it really wise policy to single out one particular disease?" This surely is the last ditch of the politician. Because there are other ills of the flesh, is this a reason for neglecting to take steps to control an infectious disease which maims or kills large numbers of our young men and women?—I am, etc.,

London, W.1. GEOFFREY MARSHALL.

SIR,—The arguments for and against the use of miniature mass radiography continue. In the meantime the construction of the plant, which is made to order, is delayed.

Dr. Jessel suggests that the design of plant has not reached a stage for large-scale manufacture. We know that the plant made to-day will bear little resemblance to that made in 1952, but there is no doubt that the present-day plant will succeed in the detection of disease. The automobile of 1903 looks queer beside the Rolls Royce of to-day. "Large-scale manufacture" is an ambiguous term, but one must realize that the machine of to-day makes its exposures more rapidly than the persons can be produced or undressed for examination. The machines at present in use carry on their task in the Royal Navy, the Army, and the Air Force of discovering suspect cases of disease, which are then examined by the usual radiological and clinical methods.

Sir Frederick Menzies foresees serious practical difficulties in that there are insufficient facilities for the treatment of the number of cases which would be discovered. This problem can surely be solved by the E.M.S. in the interim period for the cases which are medical emergencies, and a large number of such patients would not necessarily require hospitalization.

The control of tuberculosis is a wartime as well as a peacetime problem, and any progress which is made now will be amply repaid in the war effort as well as in the days of peace. We read in the *Journal* of March 28 (p. 414) that the incidence of pulmonary tuberculosis has increased in Glasgow by about 20% during the past year. This increase has been among labourers, tradesmen, and factory workers, skilled and unskilled. Here, surely, is a big chance for miniature mass radiography to provide an additional proof of its value in this great industrial city, where the incidence of this disease would, I have little doubt, be reduced by an enormous percentage within a year of the adoption of the method! But who is to order the plant?—I am, etc.,

London, S.W.3. J. V. SPARKS.

SIR,—Although Sir Frederick Menzies does not actually say that he is opposed to the immediate extension of mass radiography for the detection of pulmonary tuberculosis in recruits and in industry, his letter none the less gives the impression that because insufficient sanatorium beds are available, and because it may be unwise to single out one particular disease for a national survey, he would prefer to leave some thousands of tuberculous cases undetected even at a time when industrial strain is increasing the incidence of the disease and when blackout and shelter conditions are making the open case more dangerous than formerly. I hope I am wrong in attributing this ostrich-like attitude to so eminent an authority on public health. I am entirely in agreement with him in his advocacy of more sanatorium beds, and I also look forward to the time when periodical medical examination on life insurance lines will be generally available, but the immediate introduction of so ambitious a scheme is obviously ruled out by the present shortage of doctors. I can see no reason why the fact that the best is impracticable should be used as an argument against the introduction of an admittedly partial but none the less useful scheme. Mass radiography is quick and relatively inexpensive in comparison with the cost to the community of an established case of phthisis.

The discovery of large numbers of symptomless or almost symptomless cases of pulmonary tuberculosis will confront us with new clinical and administrative problems. Periodical *x*-ray examination of medical students at University College Hospital during the last seven years has shown us that a large proportion of minimal radiological lesions clear up without sanatorium treatment being necessary; the student goes to bed early, gives up strenuous exercise, postpones an examination, and otherwise looks after his health. The proportion of working-class patients requiring institutional treatment would naturally be higher, as a satisfactory environment is so closely connected with social status. But I do not believe that the well-equipped and necessarily expensive institution the modern sanatorium has become should be necessary for most patients with minimal lesions; sanatoria have been designed to cure established lesions discovered in patients whose symptoms have, often belatedly, caused them to seek medical advice. Mass radiological surveys naturally discover some chronic cases requiring this form of treatment, but the patient with the early radiological lesion usually only needs to be put in a good environment for recovery to follow, and "convalescent" treatment with radiological follow-up, like that given in cases of pleurisy, should be sufficient. In these cases, particularly in those occurring in war industries, rehabilitation is much more important than treatment, and I believe that the only way in which a large proportion of relapses can be avoided is for the patients to return for a time to reduced hours of work but with their pay supplemented so that a really adequate level of nutrition can be maintained.—I am, etc.,

London, W.1. ANDREW MORLAND.

Evolution of the Foot

SIR,—The slimness of the present issues of the *Journal* is sufficient indication of the stringency of the new paper quotas and a reminder to correspondents that space must be conserved. It would therefore be very improper of me to give detailed replies to the criticisms of an article entitled "Evolution as an Aetiological Factor in Foot Disorders" which have from time to time appeared in your pages.

There are two or three points, however, which demand some explanation. Mr. Pocock is correct in assuming that the drawings of the feet of the macaque and the gibbon have been transposed. This occurred during the assembly of the separate drawings into a single plate, and unfortunately escaped notice when the proofs were read. My knowledge of the foot of the gorilla, but not of the other types, is of necessity second-hand and is partly obtained from Prof. Gregory's writings on the subject. Incidentally his ideas still appear to be accepted in much American literature. I should naturally be very happy to receive further information from anyone who has first-hand knowledge of these interesting apes.

Dr. Duffield (March 7) dubs me an evolutionist; of course I am. I feel tempted to ask, "What is he?" He says that I "clinch" my argument with six indisputable observations. My actual words are: "That an evolutionary aetiology of this deformity [hallux valgus] deserves consideration is perhaps made clear by certain indisputable observations," indicating a very different frame of mind. I notice that he slurs over one of the most important pieces of evidence—namely, the drawing of an unshod native foot with well-marked hallux valgus; one of many such in my possession.

In Dr. Holt's letter (April 18) I seem to detect some conflict of ideas, or perhaps of the use of words. The human foot abounds in evidence that it has evolved from a structure having much greater universality of movement and use, and it is therefore more highly specialized (O.E.D. gives "the quality of being special, limited, or restricted") than that of the ape. Words can be great stumbling-blocks when ideas are expressed and may lead to a lot of ambiguity. For that reason I tried, apparently without much success, to avoid the use of such terms as "higher forms," "primitive types," etc., and the words "debased" and "primitive" which have been attributed to my pen are not to be found in the article. The only ex-

pression of this kind which I used was "retrogressive," and this, I believe, is an exact description of the stage through which the human foot is passing.

I must thank many private correspondents who offered to obtain further information regarding deformities among the unshod from various parts of the world, and, finally, I should like to add the text (without correction) of one letter which I received: "You definately don't understand feet if I was you I certainly would not write anymore articles in the *B.M.J.* anyone who understands feet will only laugh at you. Your latest article about foot troubles being due to evolution is sheer nonsence."—I am, etc.,

NORMAN C. LAKE.

Addiction to Benzedrine

SIR,—We have recently had several inquiries about addiction to benzedrine, obviously because the problem of stimulants is in the minds of many practitioners. In our paper in 1937 (*Journal*, 1937, **1**, 1013) we stressed its restriction, not so much because of fear of addiction but because we thought its effect might be harmful if used indiscriminately. We tried then to formulate indications for it, and we find we have nothing to withdraw, though we have learnt more about individualism in its use over the last five years. While the use of the drug was still in the experimental stage, and since, we have been in contact with several of the large out-patient departments, and we should have heard about cases of addiction had any occurred. In fact, a few cases were referred when the question arose. Most of them were patients with abnormal tolerance; we ourselves had a patient who could take 80 mg. without any effect on blood pressure or mental state. The nearest approach to what one might call addiction was the case of an asthenic, emotionally unstable woman who was given benzedrine during a period of depression; she recovered, and in a later attack rather aggressively demanded benzedrine from her doctor as she had benefited so much the first time. The fact that patients cling to a drug from which they derive physiological benefit cannot be regarded as liability to addiction—the same could be said of insulin or cough mixtures.

However, since the outbreak of the war many of our old contacts have been broken, and as the interest in benzedrine seems to have grown recently we should be very grateful if readers who have had cases of addiction would give us access to their notes. We shall be glad to report on the collective experience at a later date.—We are, etc.,

ERIC GUTTMANN.
The Maudsley Hospital, Denmark Hill, S.E.5. WILLIAM SARGANT.

Epididymitis after Acute Gonorrhoea

SIR,—I think that the answers to Lieut.-Col. T. E. Osmond's questions (April 18, p. 507) are as follows. Except for a very few devitalized gonococci, which were probably not capable of reproduction, remaining in the prostate or seminal vesicles, the patient was cured. These gonococci formed enough toxin when sucked up the vas by back pressure to cause an inflammation of the delicate lining of the epididymis. The result of this inflammation was sufficient to kill them, and in all probability no after-treatment was really necessary.—I am, etc.,

London, W.1. F. CARMINOW DOBLE.

SIR,—Lieut.-Col. T. E. Osmond asks for opinions of other venereologists concerning a case of acute gonorrhoea in which an epididymitis developed 22 days after apparent cure. He states that his case "appeared to react well to chemotherapy." Why, then, on completion of the 10 days' course of sulphapyridine was the patient given 3 days' local treatment with irrigations and instillations? The irrigations in all probability were not harmful, but the passing of an instrument to instil glycerin and acriflavine into a recently inflamed urethra was simply asking for trouble and undoubtedly the cause of the non-specific urethritis in this case. There is no doubt that a residual non-gonococcal urethritis or urinary infection was present on completion of treatment on Nov. 5. The signs and symptoms of this condition, especially in the early stages, are often mild, and unless an examination is made at least 5 hours after micturition it is likely to be overlooked.

I consider that routine irrigations are unnecessary in the treatment of acute gonorrhoea. When efficiently carried out they are not harmful, but a faulty technique and the use of strong solutions can often cause residual non-gonococcal urethritis. Tests for cure carried out immediately on completion of chemotherapy are also a frequent source of trouble, a traumatic urethritis being produced by instrumentation and rectal manipulations of a recently inflamed lower urinary tract. Incidentally the condition may also be due to the presence of soft infiltrations, stricture, inflammation of the prostate, vesiculae seminales, and Cowper's glands, intrameatal warts, and to lesions of the upper urinary tract.

Few venereologists appear to realize the dangers of urethral trauma, and it may interest Lieut.-Col. Osmond to know that at my clinics I am constantly having to treat soldiers for non-gonococcal infections resulting from treatment for gonorrhoea in military hospitals.—I am, etc.,

London, W.1. A. H. HARKNESS.

SIR,—My opinion on Lieut.-Col. T. E. Osmond's case is that the man was not cured when he left hospital and that the epididymitis was due to his gonorrhoea. According to his account, the man's treatment finished on Nov. 4 and he was discharged the next day after having one negative test. My experience is that at least a month after the end of treatment should be devoted to "tests for cure" carried out on the lines he mentions.—I am, etc.,

Newport, Mon. P. C. P. INGRAM.

SIR,—Lieut.-Col. T. E. Osmond's case is somewhat similar to one of mine some years ago. This patient turned up at out-patients with an epididymitis, was diagnosed as gonorrhoea, and was referred to the V.D. clinic. There was no history of a urethral discharge, and all tests were negative, including the blood reactions. I think these cases may be due to the secondary organisms found in chronic gleets. That similar organisms can cause acute symptoms is shown by another patient of mine, who developed an acute urethritis after connexion with his fiancée, who denied any previous connexion. The only organism found in the smears was the influenza bacillus.—I am, etc.,

South Godstone. H. E. GIBSON.

SIR,—Lieut.-Col. Osmond's letter opens up certain points of interest. In this clinic a number of similar cases have been met with where an epididymitis has followed within a month of apparently successful sulphonamide treatment of gonorrhoea and negative preliminary tests of cure. In one female patient an acute bilateral salpingitis supervened after approximately the same time interval. The absence of other customary clinical and bacteriological signs of relapse has been noteworthy. These cases have been regarded as presumably gonococcal, although in only one case of mild epididymitis has it been possible to demonstrate the gonococcus in the prostato-vesicular secretions. Puncture of the epididymis and cultures might confirm the suspected aetiology. It is of interest that a number of frank urethral relapses in males within a month of apparent cure and satisfactory tests have also been recorded, the gonococcus being easily demonstrable and alcohol apparently the precipitating factor.

The explanation lies in the unaltered anatomical possibilities of gonococcal infection, and in the probability that the sulphonamide preparations may be unable invariably to complete prompt eradication of all foci in the urethral crypts, prostate and vesicle, perivasal lymphatics, epididymis, etc., leading in some cases to obvious urethral relapse or other "complication." These possibilities, while infrequent, as judged from the relatively small number of cases seen, suggest the consideration of massive plate cultures and the utilization of condom specimens as additional tests of cure. By this means it might be possible to determine the percentage and period persistency of the gonococcus in the tissues of apparently successfully "cured" cases.—I am, etc.,

Newcastle General Hospital. A. E. W. MCLACHLAN.

Post-infective Blood Changes

SIR,—The paper by Dr. H. W. Hales (April 18, p. 495) calls for comment, at least from the haematological aspect.

In brief, one may say that Dr. Hales has seen a case of pneumococcal septicaemia in which the initial neutrophilia was replaced by mononucleosis at the time the temperature settled

to a more or less normal level. From this observation Dr. Hales draws the inference that it is conceivable that "pneumococcal bacteriaemia is an early factor in the aetiology of glandular fever." It cannot be too widely known that every case in which there is neutrophilia due to infection is followed by post-infective lymphocytosis, monocytosis, and, often, eosinophilia. Whether these post-infective changes in the blood picture are a part of the reparative process is uncertain, but they are certainly "a sign that the body defence has won against an invasion by organisms."

In the past papers dealing with post-infective blood changes were quite common, but it is long since I last saw the recognition of them hailed as a new discovery. It is true that too extensive a knowledge of medical literature may impair originality, but it is well that your contributors should know the elements of their subject before asking you, in these difficult days, to waste paper on reprinting old observations.—I am, etc.,

London, W.1. A. PINEY.

Haemoglobin of Pregnant Women

SIR,—Dr. W. Kerr Henderson (April 11, p. 480) states that I am "opposed to the possibility of iron administration to the mother having any effect upon the blood of the child (1931)." In my 1931 monograph, however (Medical Research Council Special Report No. 157), I said that it was probable that anaemia in the mother predisposes to anaemia in the child, though I was then unable to furnish proof of this. In 1933 Strauss (*J. clin. Invest.*, **12**, 345) succeeded where others had failed, and provided satisfactory proof that anaemia in pregnant women was one direct cause of anaemia in infancy. There is much as yet unsolved regarding iron absorption and utilization, but this at least we know: that diets low in iron cause anaemia and that medicinal iron is a curative and prophylactic agent. Unfortunately nutritional anaemia is at present widespread.—I am, etc.,

London, N.W.3. HELEN M. M. MACKAY.

*** With this letter the correspondence is closed.—ED., *B.M.J.*

Refractory Anaemia

SIR,—May I be allowed to correct a misunderstanding which might have arisen from your leading article of Dec. 27 reviewing two papers in the *Quarterly Journal of Medicine* of July, 1941, on refractory anaemia. The papers, as submitted for publication late in 1940, included a footnote explaining that the work on which they were based had been done over some eight years by Dr. C. P. Rhoads and his successive assistants, Drs. Barker, Dexter, Dobriner, Erf, Hummel, Miller, and myself. This note was unfortunately cut out while I was abroad. When, therefore, you say that workers on the problems of trinitrotoluene poisoning will learn much from "the ideas and technical methods which Bomford and Rhoads have developed" these should be attributed to Dr. Rhoads and the several members of his department mentioned above.

I owe my late colleagues in America an apology if the omission of this footnote made it appear that I was claiming a greater share in this work than my actual contribution merited.—I am, etc.,

West Africa. R. R. BOMFORD.

Preserving the Race

SIR,—There is so much good sense in Dr. Lindsey Batten's letter on the above subject (April 18, p. 507) that one particularly regrets the sentence: "If, by a not impossible revaluation of values, charity were preferred before chastity, mothers honoured as mothers and children welcomed as children, assets would undoubtedly predominate"—not alone or chiefly because "charity before chastity" is what Macaulay would have called "a wretched conceit" (I suppose the alliteration was too tempting) but because of the suggestion that chastity is a comparatively unimportant thing. If the better race that we all desire depends upon a eugenic system that flouts chastity, we are indeed in a parlous state. A nation that "honours mothers as mothers," regardless of their moral right to be mothers, is asking for trouble. No one surely wishes to be hard on the unfortunate, but to make no difference between the chaste and the unchaste must necessarily result in depreciation of marriage and the consequent crumbling of the family—the undermining, in fact, of the twin pillars upon which our national position depends. No thoughtful person, surely, can contemplate with equanimity such a dénouement.—I am, etc.,

Ilford. T. MILLER NEATBY.

Complacency in Anaesthetics?

SIR,—Dr. John Elam (April 18, p. 508) has made an admirable suggestion; it is now a most opportune time to make a comprehensive survey of the merits and demerits of all anaesthetic reagents and techniques.

Complacency was rudely shattered when Sir James Walton very rightly inferred that the acarbia of open ether was a lesser evil than the anoxaemia of gas and oxygen, or the more insidious peril of the spinal and the intravenous needle: that the cap fitted was shown by the fact that but one dissentient voice was raised, which, I was pleased to see, emanated from Oxford, when Dr. Bannister ventured to suggest that the fault lay not in the modern machines but in the men behind them.

The familiar Boyle's apparatus designed for the production of gas-oxygen anaesthesia with or without minimal ether is more commonly employed to provide an inefficient and asphyxial ether anaesthesia; hence it is rightly regarded as anathema by many surgeons. Intelligent use with regard to its limitations would do much to redeem the reputation of a useful piece of apparatus.

The danger of intravenous and spinal anaesthetics lies in the fact that the patient has no mechanism of defence against their misuse, a sharp contrast to open ether, when he can save himself from overdosage by respiratory arrest before his vital centres are poisoned. The danger of chloroform has so been stressed that it is used with meticulous care; the safety of gas-oxygen has been so vaunted that it is used with abandon; at my hospital I have seen no death due to the former but two from the latter, occurring in straightforward operations on young healthy subjects.

Also, I feel convinced that Admiral Gordon-Taylor did not prefer his charge of lunacy against such men as Pitkin and others who give gunshot wounds of the intestine as an indication for spinal anaesthesia, but against those who would employ it in the presence of shock and haemorrhage, so commonly encountered in present-day war injuries.

I submit that the danger lies not in modern anaesthetic apparatus and new agents but in their ill-judged and haphazard use. The eclectic attitude and flexibility of technique for which I recently pleaded in connexion with spinal anaesthesia, if applied to all branches of the art, would constitute the best answer to the well-founded charges with which modern anaesthesia stands indicted. The comprehensive and co-ordinated survey suggested by Dr. Elam seems to be the only method by which the various indications and contraindications for the many new methods and reagents may be compiled for the guidance of those anxious to use that best suited to any case under consideration, and, if based on a large number of cases handled by acknowledged experts, it would speak with the voice of authority.—I am, etc.,

H. W. LOFTUS DALE,
Aylesbury. Senior Hon. Anaesthetist, Royal Bucks Hospital; Anaesthetist, E.M.S.

Treatment of Infant's Umbilical Hernia

SIR,—I have recently had occasion to observe that there is a widespread ignorance of the correct method of applying strapping in the treatment of umbilical hernia in the infant. Although it is true that the majority of cases will undergo a natural cure if left alone, there is no doubt that efficient strapping will hasten the process and will also alleviate the windy spasms so likely to sow the seeds of chronic indigestion.

Many doctors are in the habit of applying a pad of wool or lint on top of the protuberant umbilicus and fixing it there with elastoplast. If the baby is examined in a day or two it will invariably be observed that, owing to the inevitable slackening of the strapping, the pad has been forced between the two halves of the rectus muscle, thereby increasing the divergence. When this method was originally described the use of a penny was advocated: this, being both wide and hard, could not be forced between the muscles and did achieve some splintage. The following method is, however, more satisfactory, and I have never known it fail to achieve a cure in, at most, four weekly applications.

Using a strip of elastoplast 4 in. by 6 or 8 in., apply one-half to the baby's abdomen as far as the midline. The nurse or mother must now push the other half of the rectus muscle towards the middle and hold it there while the doctor sticks down the remainder of the strapping. The object of this is to fix the two halves firmly together and thereby to give the underlying tissues an opportunity to unite. A refinement useful when dealing with a very large hernia is as follows. Cut two strips of elastoplast each 1 in. by 6 in.; apply one-half of one piece to the right side of the abdomen with its lower border on a level with the middle of the umbilicus, and one-half of the second piece to the left half of the abdomen with its upper border on a level with the middle of the umbilicus; holding an end in each hand, pull them hard across and stick down. Reinforce with a straight piece on top.

It may be argued that a certain amount of chafing of the skin will occur owing to its being tightly folded in the midline; this can be minimized by careful powdering, and in any case causes little discomfort and is a small price to pay for a quick and efficient result. Before applying the strapping it is, of course, necessary to make sure that no polypus is present; if one is, a thread must be tied tightly round its base. After a day or two the polypus will drop off and the strapping may be applied.—I am, etc.,

Barking. L. M. M. BEADNELL.

The Teaching of Anatomy

SIR,—Students' opinion of the present system of teaching anatomy has not so far been expressed in the correspondence on this subject. As students who have just completed the Second M.B. course in anatomy we would like to record our own views.

All the correspondence so far has been in favour of a reduction in the number of details of gross anatomy learnt. It has been suggested that this might be accomplished by limitations in the scope of examination questions. It is difficult to conceive of a question the answer to which could not be improved by additional details. It would thus appear that a syllabus must be prepared, comparable with those of other subjects, limiting the scope of knowledge required; this could be accomplished by the production of an entirely new textbook upon which the examination should be based. This is, no doubt, a very difficult task, but might be tackled on the lines adopted for the production of the revised terminology. The majority of students cannot feel satisfied that their knowledge of anatomy is adequate until they have thoroughly learnt the recommended textbooks. The production of a new textbook based on such a syllabus would thus discourage the student from learning useless details.

This idea would enable the importance of functional, clinical, and comparative anatomy to be satisfactorily expressed. From the students' point of view, closer co-operation between departments is desirable. Thus the divorce of zoology from anatomy, as is produced by the subdivision into faculties, considerably reduces the value of zoology in assisting the student to a more complete understanding of anatomy.

Correspondents have differed on the value of dissection of the whole body; we feel that the value is considerable, for we should have found it impossible to understand anatomy without at least having seen the cadaver in varying stages of dissection. Whether or not the time spent in "cleaning up" a dissection is well spent is, however, doubtful.—We are, etc.,

JOHN R. HESELTINE.
Leeds. G. R. FRYERS.

Industrial Medicine and Sickness Absence

SIR,—I should like very emphatically and most warmly to support Mr. R. Watson-Jones's letter (April 11, p. 478). This war is by no means won. The duty of the medical men who are engaged in "civilian" practice is to keep the army of workers as fit as possible, and when they are rendered unfit, either by accident or by disease, to get those men and women back to the factories with the minimum loss of time.

I spend very much of my time examining accident cases for employers, insurance companies, and solicitors, and I have been appalled at the apparent lack of encouragement given to patients by men in general practice. Time and again men are discharged from the out-patient department of a hospital as fit to return to work, and these self-same men then go to their panel doctors, who immediately begin to issue weekly certificates of incapacity; and the reason of such incapacity is stated on the certificates as still "suffering from the effects of injury." I frequently ask these injured people what treatment they are receiving from their family practitioners, and they tell me that the doctors merely issue a weekly note, and this is all they have time to do. *Now*, above all, is the time to devise means of encouragement for these patients, and to urge them to get better by exercising their injured joints, and by encouraging them to forget about their claims for compensation.

It seems to me useless planning for the future when we do not know what the future yet holds. Now is the time, not for starting study circles, but for action. There is not a great deal that needs altering in the economic structure of the medical profession, and necessary alterations can follow the usual genius of the English people, which is by evolution. Most of the nation is putting up with necessary bureaucratic and dictatorial methods in order to win the war; accordingly, a few members of the medical profession feel that now is the time to enforce such methods into the organization of medicine. One of the objects for which we are fighting is the freedom of the individual. The British public is not going to have assigned to it, in spite of its wishes, this medical man or that.

Admittedly the financial and economic structure of hospital organization will have to be overhauled drastically. In the meantime, however, all our energies and thoughts should be bent upon getting back to work a week or two earlier the vast army of sick and injured workers. I have no idea of the numbers who must be off work each week through sickness or accidents in the country, but, as Mr. Watson-Jones says, if all these people could be got back to work a week or two earlier there would be created an additional army for the war factories.—I am, etc.,

STUART MCAUSLAND, M.D.,
Formerly Chairman of Convocation, University of Liverpool.

Voluntary Hospitals: The Piper and Tune

SIR,—The discussion on voluntary hospitals has interested me greatly, especially the statement that those who rise in the service of the county hospitals are apt to become administrators rather than clinicians. That is what happened in the R.A.M.C. and to which I drew attention in a work of mine called *A Vision of the Possible*.

In Canada the hospitals have one capable administrator—almost a special service. But the most serious criticism arises from the fact that in Australia, at all events, if an organization accepts Government money it is most likely to come under political control. The permanent heads are often very fine men, but the last word rests with the politician.

The Victorian Bush Nursing Association now administers through a decentralized mechanism sixty-one hospitals in the country providing about 700 beds. But it has neither asked for nor received Government aid except for passes on the railways for the nurses. If it had acted otherwise its autonomy would have gone, as it has in some of the other States where there can be either no hospitals at all or hospitals limited to two beds. In those cases the associations receive Government subsidies and consequently are under Government control.

I am sure that in a future condition, not in sight at present, a wise statesman will be considering not so much what he can do but what he can let alone. People cannot have it both ways. If a Government pays, then naturally the politician takes control. As the politician in charge varies so does the bureaucratic machinery alter accordingly. My experience has been remarkable, and in happier times I propose to set it out at length.

As a whole, the political feeling is one of support and sympathy for the Victorian Bush Nursing Association, but all recognize that it is independent and self-supporting and, as stated, completely decentralized. In administration the local people know best what their requirements are. The central body provides the nurses and advises when necessary and requested.—I am, etc.,

JAMES W. BARRETT,
Melbourne. Honorary Secretary, Victorian Bush Nursing Association.

Diphtheria Immunization with A.P.T.

SIR,—It is to be hoped that the article by Drs. F. Fulton, B. Moore, Joan Taylor, and A. Q. Wells, and Prof. G. S. Wilson on immunization against diphtheria with alum-precipitated toxoid (March 7 and 14) will be widely read by general practitioners as well as by personnel of the public medical services.

The general practitioner can, and should, do everything possible to encourage parents to have their children treated. He will not do this unless he can be interested in the subject, and has a full understanding of the work and the benefit to be expected therefrom. Considerable public dissatisfaction is bound to occur unless practitioners who carry out the work of inoculation on behalf of public health authorities are fully alive to their responsibilities. The percentage of children protected can only be satisfactory when there are keenness and co-operation on the part of the private doctor and the public health specialist.

Many towns and counties can show excellent figures of children fully protected, but it is feared that there are many other districts in which the results are not so good. It is felt that a good deal of this failure may be due to a lack of proper understanding on the part of the private practitioners who carry out the work of inoculation. They should realize its importance apart from the fact that they are paid reasonably generously for their services in this respect. Every effort should be made to attend punctually at the time and place arranged, ample supplies of material taken along, and plenty of time allowed in which to complete the work arranged. Nothing is more conducive to lack of co-operation on the part of parents than to have to make several journeys to centres with their children before even one inoculation is received. They lose confidence in the medical services and are put to no end of inconvenience. The mother at home deserves every consideration in these difficult times, especially those in reception areas, where their work is even more arduous.

The article referred to above stresses the importance of the second dose, and a little care and forethought at the time of giving the first dose will ensure that the same children are brought together again at the appropriate time for the second inoculation.

It may be said that the private practitioner is far too overworked to attend to all such details. If this is the case, then they should decline to take on the work. In such cases it is suggested that the necessary help could be obtained from the nearest E.M.S. hospital, where there is usually sufficient staff to spare a medical officer for one or two afternoons to carry out this all-important service.—I am, etc.,

Basingstoke. J. J. DAVIS.

*** The part played by the general practitioner in the "spring campaign" for diphtheria immunization just started by the Ministry of Health is referred to in a leading article at p. 556. —ED., *B.M.J.*

Post-war Planning and Winning the War

SIR,—The letter of Mr. R. Watson-Jones (April 11, p. 478) is interesting. It would appear almost unnecessary to say that this country is intent on winning the war, and the statement applies to every member of the medical profession. We shall not, however, lose the war by taking a little thought for the future. Indeed, it is not unlikely that if our political leaders had shown foresight the present crisis would never have arisen.

Medical planning has not been initiated, as suggested by Mr. Watson-Jones, because the medical profession are fearful that some new Act will be passed relating to medical practice or that a whole-time salaried medical service will be introduced. On the contrary, it has been begun because many members of the medical profession feel that practitioners have not been organized in such a way as to produce the tremendous acceleration in the industries of war by preventing wastage of manpower, minimizing incapacity periods, and accelerating recovery from disease and injury, mentioned by Mr. Watson-Jones in the early part of his letter.

The Medical Planning Commission has been set up to consider how best the profession can do the very things Mr. Watson-Jones wants done: how, indeed, it can best be utilized to reduce sickness, to prevent disease, and to maintain and improve health. These are big problems, and the Commission is doing its best with all others who are interested in endeavouring to arrive at some solution so that organized medicine may, as a whole, be concentrated on the early detection of disease and speedy recovery, on the prevention of disease, and on the maintenance and improvement of national health.

It is really worth while to consider these matters even if only in our leisure time, and I for one, and I am sure many others, would be glad to have from Mr. Watson-Jones any helpful suggestions which I am sure he is able to and, I hope, will offer towards the solution of the extremely intricate problems with which the Commission is grappling.—I am, etc.,

GEORGE F. BUCHAN,
Medical Officer of Health, Willesden.

Finance and Medical Service

SIR,—Those who are concerned with the question of State Medical Service after the war would, like other people interested in post-war planning, do well to realize the function and importance of a sane financial system. Our present financial system, which is insane, only permits the creation of money for three purposes: the making of bank loans, the purchase of securities by banks, and the purchase of gold by the Bank of England. The supply of money, especially in peacetime, is regulated in the interests of moneylenders and not of producers and consumers, with the result that the amount of money in existence is inadequate.

Under a sane financial system money, not in the form of debt, would be created to finance a number of desirable objects. The supply of money would be regulated by the country's maximum output and import of real wealth in the form of desired goods and services, and taxation would be employed, not for the collection of revenue, but solely for the prevention of inflation. Under a sane financial system everything morally right and physically possible is also made financially possible. If labour, scientific knowledge, and materials are all available nothing is ever turned down because there is no money.

After the war, if a sane financial system be adopted, the only limit to the service that medicine will be able to render will be set by the labour, scientific knowledge, and materials available; by the goods also available for the support of those engaged in medical work; and, in cases where other interests compete for limited supplies, by the amount of consideration that those other interests, rightly or wrongly, receive in the matter of goods or services but *not* money.—I am, etc.,

Woburn. BEDFORD.

Obituary

ROBERT B. CAMPBELL, M.D., F.R.C.P.ED.

It is with deep regret that we record the passing of Dr. Robert Brown Campbell, which occurred at Edinburgh on March 26. He qualified at Edinburgh University in 1895, and, after two voyages to India to recuperate after a trying illness, he decided to become a mental specialist. First appointed assistant at the Inverness District Asylum, he served successively at Montrose Royal and Crichton Royal before being recalled to Inverness as medical superintendent. On Dr. George Robertson's translation to Edinburgh Royal Mental Hospital and the chair of psychiatry Dr. Campbell was chosen to succeed him at Larbert, and there he remained from 1908 till 1935, extending and completing an already substantial amount of solid work, greatly to the advantage of the patients under his care. He became a Fellow of the Royal College of Physicians in 1912, and his specialist colleagues recognized his worth by electing him president of the Royal Medico-Psychological Association in 1932. He had been a member of the B.M.A. for 46 years and was president of the Stirling Branch in 1926-7. In 1914-18 he was a mental specialist with naval rank of commander, and in 1939 had a specialist appointment under the Department of Health.

Dr. Campbell was a man of singularly attractive and genial nature, who made quite unconsciously many friends wherever his lot was cast. Wise in counsel, clear, persuasive, and convincing in argument, he never forgot that a question may have more than one side. His active mind found scope for usefulness in his retirement, and he served his college well as a councillor, as one of the managers of the Royal Infirmary, and as a

member of several committees. Fishing and reading were his recreations, and his gift for friendship was known in many a Highland and Western Islands fishing circle. He was very happily married, and the loss of his wife in January of this year appeared to sound the knell of his own departure. To his three sons and to his daughter we extend our affectionate sympathy in their double loss. With them there remains an imperishable memory of unselfish devoted parents. J. O.

HILDRED CARLILL, M.D., F.R.C.P.

Dr. Hildred Bertram Carlill, who retired from the post of physician to the Westminster Hospital in October, 1940, died suddenly at Tavistock, Devon, on April 16, aged 60.

He was educated at Harrow School and went up to St. John's College, Cambridge, in 1899, and having taken his B.A. in the Natural Sciences Tripos entered Guy's Hospital, where after graduating M.B., B.Ch. in 1907 he held house appointments. He was then for a time resident medical officer at the East London Children's Hospital and proceeded M.D. in 1910. Before his election as assistant physician to the Westminster Hospital in 1920 Carlill had joined the visiting staff of the Miller General Hospital, the Belgrave Children's Hospital, and the Seamen's Hospital, Greenwich; he was also for some years physician to the Victoria Park Chest Hospital and to the West End Hospital for Nervous Diseases. During the last war he held a temporary commission as surgeon lieutenant, R.N., and served for eighteen months in the battle cruiser *New Zealand* and for three years at the Royal Naval Hospital, Haslar, as neurologist and psychiatrist. As a Hunterian Professor at the Royal College of Surgeons in 1918 he lectured on syphilis of the nervous system, drawing largely on his extensive experience at Haslar; and as Arris and Gale lecturer in 1927 his subject was simulation of surgical affections by hysteria. He joined the British Medical Association in 1920 and was honorary secretary of the Section of Neurology and Psychological Medicine at the Glasgow Meeting in 1922. The Royal College of Physicians elected him a Fellow in 1939. At the Westminster Hospital he lectured on clinical medicine and on nervous diseases, and was senior physician during the two years before his retirement from the active staff.

News has been received of the death of Dr. ADRIEN LOIR on Dec. 16, 1941, the day after his 79th birthday. Dr. Loir died in Paris, where, 59 years before, he began work as the assistant of his uncle Louis Pasteur. Pasteur's stroke in 1868 left him with a paralysed arm, and the young Loir was trained in laboratory technique by his father, then professor of chemistry in the University of Lyons, to perform the experiments which Pasteur himself directed. For six years—1882-8—Adrien Loir worked each day with Pasteur in the little laboratory in the Rue d'Ulm. It was during these years that Pasteur made his famous investigations on rabies and anthrax. The first mass inoculation for the prevention of hydrophobia was made on 21 Russians from Smolensk in March, 1886. Dr. Loir founded four Pasteur Institutes in different parts of the world. In 1886 he went to Russia to found the first foreign Pasteur Institute in St. Petersburg, and in 1889 he left the newly established Pasteur Institute in Paris to found the Australian Pasteur Institute in Sydney, which he directed for five years. In 1893 he was sent to Tunis, where he was in charge of the Pasteur Institute for nine years. The last Pasteur Institute founded by Dr. Loir was at Bulawayo in 1902. In 1906 he was sent by the French Association for the Advancement of Science to Canada, where he remained for two years. During this time he studied trichiniasis and was given a chair at the University of Montreal. In 1909 he returned to France to take up the appointment of medical officer of health of Le Havre, where he remained for 30 years. He was a prolific writer on medical and scientific subjects; the breadth of his interest is shown by the fact that for many years he was curator of the Natural History Museum at Le Havre and director of the Oceanographical Laboratory of the University of Caën. During the last war the presence of large numbers of British troops at the base camp at Le Havre involved close and always cordial co-operation with the British authorities, and his services to this country were recognized afterwards by the award of the M.B.E. At the time of his retirement in 1939 Dr. Loir was an Officer of the Legion of Honour, member of the Academy of Medicine, member of the Council of Public Health in France, and president of the Society of Medical Officers of Health of France. He received numerous honours and distinctions, including the LL.D. of the University of Glasgow, during a long and valuable lifetime.

The Services

ARMY AWARDS

The King has granted permission to Col. (Temporary Brigadier) D. T. M. Large, late R.A.M.C., to wear the Military Cross (First Class) conferred upon him by the King of the Hellenes in recognition of services to the cause of the Allies.

The M.C. has been awarded to Capts. A. M. Canter and J. McD. Dougan, R.A.M.C., in recognition of gallant and distinguished services in the Middle East, and to Lieut. V. K. Sundaram, I.M.S., in recognition of gallant and distinguished services in Burma.

The King has approved the following awards and mentions in recognition of gallant and distinguished services in the Middle East during the period July to October, 1941:

C.B. (*Military Division*): Major-Gen. S. R. Burston, C.B.E., D.S.O., V.D., Australian Military Forces. *C.B.E.* (*Military Division*): Col. J. Steigrad, Australian Military Forces. *O.B.E.* (*Military Division*): Temp. Col. R. P. Cormack, R.A.M.C., Lieut.-Cols. A. L. Dawkins and K. W. Starr, Australian Military Forces, and Lieut.-Col. R. N. Khosla, I.M.S. *M.B.E.* (*Military Division*): Capt. (Temp. Major) M. M. Medine and Capt. A. D. Picton, M.C., R.A.M.C., and Major (Temp. Lieut.-Col.) J. O. Smith and Major I. J. Wood, Australian Military Forces. *Military Cross:* Capt. (Acting Major) R. J. Niven, R.A.M.C. *Mentions:* Capt. (Temp. Major) G. A. H. Buttle, R.A.M.C., and Cols. K. B. Fraser and H. G. Furnell, D.S.O., and Lieut.-Col. D. W. McCredie, M.C., Australian Military Forces.

CASUALTIES IN THE MEDICAL SERVICES

Surg. Lieut.-Cmdr. ROBERT CHALMERS ANDERSON, R.N.V.R. (H.M.S. *Hermes*) is reported missing, believed killed on active service on April 9. He was 34 years of age, and was the youngest son of the late W. Anderson and Mrs. Anderson of Glasgow, and was educated at the University of Glasgow, where he graduated M.B., Ch.B. in 1933. He held the post of house-surgeon at the Royal Alexandra Infirmary, Paisley, before settling in general practice. In 1940 he entered the R.N.V.R. as surg. lieut., and was promoted surg. lieut.-cmdr. a year later. He had been a member of the B.M.A. since qualification. He leaves a widow.

Captain PETER GORRIE, R.A.M.C., was killed by enemy action in the Pacific early this year. He was educated at the University of Edinburgh, where he graduated M.B., Ch.B. in 1908, proceeding M.D. in 1910. After filling the post of house-surgeon at the Cancer Hospital he went to Australia and practised in Adelaide. He served in the war of 1914-18. His younger son, Pilot Officer Peter Gorrie of the R.A.A.F., was killed flying in the Far East last January.

Among the seventeen officers killed in the accident during Combined Operations near Warminster on April 13 was Lieut. JOHN CHRISTOPHER HAWKS, R.A.M.C., whose home was in Liverpool. He was the son of Dr. and Mrs. F. Swanson Hawks, was born on June 1, 1913, and graduated B.M., B.Ch. of the University of Oxford in 1940. He entered the R.A.M.C. as temp. lieut. in October last year, and was attached to the London Scottish.

Missing.—Capt. A. Barber, R.A.M.C., Capt. J. E. A. Bartlet, R.A.M.C., Lieut. G. Blair, R.A.M.C., Capt. C. D. Chilton, R.A.M.C., Major G. H. Garlick, R.A.M.C., Capt. W. R. Grant, R.A.M.C., Major W. J. E. Phillips, R.A.M.C., Major J. A. Reid, R.A.M.C., Capt. L. D. Stone, R.A.M.C.

The Sarawak Government offices announce that they have been informed that Mrs. Elizabeth Josephine Le Sueur, M.B., B.Ch., and Dr. Eslyn Marcar Marjoribanks are missing, believed prisoners.

Universities and Colleges

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Gifts for Restoration of the Museum

In addition to the many offers of help towards the restoration of the Museum of the Royal College of Surgeons which have already been announced, some notable gifts and promises have recently been gratefully received.

The Council of the University of Manchester, on the suggestion of Prof. Wood Jones, has presented the specimens assembled and prepared by the late Prof. Morrison Watson to illustrate Hunterian ideals. It was felt by the University authorities that the collection would be more generally useful to students and research workers if housed in the museum of the headquarters of British surgery.

The Medical Committees of the Royal Cancer Hospital and of St. Mark's Hospital have presented specimens illustrating different forms of malignant disease. These gifts will form a valuable section of the pathological museum.

The Royal Australasian College of Surgeons is arranging for hospitals throughout Australia and New Zealand to collect specimens illustrating pathological conditions commonly seen in those countries and seldom met with in the British Isles. The specimens will be stored in the different hospitals and presented to the English College after the war.

Further generous help has been given by Australia. The authorities of the Institute of Anatomy at Canberra have earmarked a considerable number of duplicate specimens for transfer to England, and have promised that after the war they will organize expeditions to collect specimens of those rare marsupials and monotremes of which they do not possess duplicates.

The High Commissioner for New Zealand has interested his Prime Minister in the restoration of the Museum, and has received a message assuring him that the Minister of Health for the Dominion is enlisting the help of New Zealand surgeons in the collection of specimens.

The Rector of the Egyptian University, Sir Ali Ibrahim Pasha, and the Dean of the Faculty of Medicine, Prof. S. Azmi Pasha, have also sent assurances that Egyptian surgeons will give every assistance and will arrange for the collection of specimens illustrating diseases not met with in Great Britain. The specimens will be presented to the Royal College of Surgeons after the war as a token of gratitude for benefits received and for the hearty co-operation which has existed for many years between British surgeons and their colleagues in Egypt, most of whom are Fellows of the English College.

UNIVERSITY OF MANCHESTER

The following candidates have been approved at the examinations indicated:

THIRD M.B., CH.B.—*Pathology and Bacteriology:* D. J. Atherton, Margaret A. Barber, Alice I. Burke, Margaret R. Burke, W. Clegg, L. Erin, F. Fletcher, J. W. Fletcher, E. Isherwood, R. M. Laslett, T. Moss, A. Ramdsen, P. H. Renton, M. M. Rose, B. Samuels, P. Vulfsons, Margaret Wardle. *Pharmacology:* Margaret A. Barber, R. B. Broughton, S. Epstein, G. V. Feldman, Margaret Hedley, E. V. Mellor, Nancy B. Penney.

UNIVERSITY OF GLASGOW

A graduation ceremony was held on April 18, when the following medical degrees were conferred:

M.D.—*†W. F. Anderson, G. L. Brown, I. Campbell, I. MacK. Davidson, R. Gibson, J. B. Macdonald.

M.B., CH.B.—A. S. Anderson, T. Anderson, W. Anderson, W. L. Anderson, R. V. Bannister, P. Beattie, E. Bebbington, B. Bernard, R. H. Bowie, R. Burns, R. M. Calman, M. M. Campbell, H. O. Chisholm, T. A. Cockburn, W. Craw, W. M. B. Davidson, Marion Ferguson, A. Finlayson, M. Fogell, A. Forrest, Esther M. Forsyth, Marion H. Fraser, W. D. Fraser, T. B. Gardiner, R. S. Gibson, R. D. Glaister, J. S. T. Goldie, A. M. Greenshields, D. Gregory, J. R. G. Grice, W. G. Harrington, A. H. D. Hunter, F. W. B. Iveson, W. Jack, I. J. MacCammond, I. F. McCaw, H. McK. McDonald, A. J. McKendrick, P. McKillop, J. McKimmie, A. A. McKirdy, S. C. Macmillan, A. T. McNeil, J. Macpherson, D. Martin, Jane H. Merry, D. Mitchell, J. E. Morton, T. M. Park, I. S. Phillips, Normana R. Plews, J. S. McK. Pollock, J. S. S. Pollock, T. M. Pollock, J. M. Rosie, Maeve Rusk, J. W. Sandler, I. Shenkin, M. Sluglett, A. Starritt, T. Stevenson, I. H. Stewart, S. D. Thomson, Elizabeth P. Wade-Evans, J. F. H. Wood.

The following prizes among others were awarded:

University Prizes.—Bellahouston Medals: R. M. Calder, Margaret D. Crawford, A. C. Lendrum. Capt. H. S. Ranken, V.C., Memorial Prize: May B. Paterson. *Special Class Prize.*—Surgery, Macleod Medal: F. Finlayson.

*With honours. †*In absentia.*

CONJOINT BOARD IN SCOTLAND

The following candidates, having passed the final examination, have been admitted L.R.C.P.Ed., L.R.C.S.Ed., and L.R.F.P.&S. Glasg.:

A. Bernstein, H. B. Bieber, Lois C. Burgh, A. W. Chambers, P. Cherico, H. C. Denis, G. Fahmy, Elizabeth H. C. Geach, W. Gibson, S. W. Grant, R. I. Greenblatt, I. V. Hankins, N. M. Jaret, S. M. Kahn, J. H. Kelly, N. Margolis, R. Meek, L. Naftalin, R. A. Ramsay, R. M. Rizkalla, Gurdeep Singh, A. U. Somerville, T. A. Spitz, L. Stone, K. T. Sweeney, G. N. Tyler, P. Weyman.

A week-end course in industrial medicine will be held in the Algernon Firth Institute of Pathology, University of Leeds, on Saturday and Sunday, May 30 and 31. It is intended for medical practitioners, and especially for those concerned with factory medical services. On Saturday at 2.30 p.m. Dr. J. C. Bridge will lecture on some medical aspects of factory legislation, followed by Dr. R. E. Lane on the nature and prevention of toxic risks in industry. On Sunday at 10.30 a.m. Dr. S. A. Underwood will lecture on the doctor's place in industrial organization, followed by Dr. J. T. Ingram on industrial dermatology; and at 2.15 p.m. His Honour Judge Frankland will speak on some medico-legal aspects of industrial injuries, followed by Mr. J. Foster on industrial eye injuries. The fee for the course is one guinea, and forms of application may be had from the Dean, School of Medicine, Leeds, 2.

Medical Notes in Parliament

FUTURE OF HOSPITALS

In the House of Commons on April 21 Mr. MCNEIL initiated a debate on hospital administration. He moved a resolution declaring that the House recognized the need for regional planning of hospital services and was of opinion that the utmost efficiency with maintenance of democratic control could only be secured by full recognition of the status and responsibilities of local authorities; that throughout the country there should be no lack of accommodation, with the requisite staff, for all persons requiring treatment; and that, especially in areas already amply served, independent schemes for the future building of hospitals should be discouraged as being inimical to a proper co-ordinated post-war plan. He contended that the present hospital system lacked the necessary extension and elasticity that the country needed to cope with the enormous development of tuberculosis. The weapon we must use to tackle these deficiencies was regionalization.

During the debate which followed, Mr. STOREY said there were good features about both the voluntary and the local authority hospital systems, and already there had been much fruitful co-operation between the two. It was necessary to take what was best in both and to build up a comprehensive hospital service through which appropriate treatment would be readily available to every person in need of it. The service must be based on considerable areas. Equipment and accommodation were expensive to provide, and specialist skill was limited in supply. We must, therefore, try to co-ordinate the two in economic units. Through the Emergency Medical Services and the work of the Nuffield Trust, the local authority and the voluntary hospital systems were learning to know each other and work together.

Regionalization through Co-operation

Sir FRANCIS FREMANTLE said that what was required was that the voluntary hospitals, the municipal hospitals, separate clinics, general practitioners, clinics that had grown up to deal with special diseases, the dispensary system, and a very large number of different schemes or arrangements should be cemented together, not that they should be swept away and replaced by a single system. They had grown up out of natural needs, with natural help around them, and we wanted to use those needs and that help in a natural way. In Hertfordshire there were two voluntary hospitals working with a large amount of municipal finance and a good deal of municipal responsibility for their management, and the combination worked very well. That was a kind of ideal more likely to prove acceptable throughout the country than the ideal of one single service. The teaching hospital was the university of the medical profession. The lesson that the teaching hospital should be the basis of the scheme of reorganization was brought home by the committee under Lord Dawson which reported in 1920. That report suggested that the hospitals should be arranged in three categories—the casualty hospital, the provincial town hospital, and the base hospital—and that they should be in proper proportion to each other. He hoped that the regional proposal might lead in that direction, but we must beware of having a cut-and-dried system laid down for the whole country. The system of regionalization must grow up naturally, but it must be given opportunities for growth.

There must be a regional advisory committee that would cover the region, but the matter could not be taken out of the hands of the local authorities so far as they were concerned. The local authorities must be the larger areas, the counties and county boroughs. The regional advisory committees should be statutory bodies and given the necessary powers. A similar body to the University Grants Committee should have responsibility for the distribution of the money that would be provided by the Government. It would not be sufficient for the Government to give the subsidies to the local authorities.

Health Centres

One scheme that was being suggested, continued Sir Francis, was for health centres outside the hospitals to bring together the different clinics of the local authorities, the general practitioners, the hospital services, and also the nursing services. The question would arise whether they were to be run by the local authorities, the general practitioners, or the hospital authorities. It was too big a matter for the Medical Planning Commission to decide easily, but he threw out the suggestion.

Dr. W. RUSSELL THOMAS said that instead of setting out to plan for the future for disease we should consider good health and not ill-health as being the natural heritage of man. People were disease-conscious. If people were well housed, had good

wholesome food, healthy exercise, healthy occupations, and healthy minds, disease would almost disappear. He hoped that the Minister of Health would approach the question not by concentrating entirely on the organization of hospitals but from the viewpoint that we were all born healthy, and that we should be maintained healthy by proper surroundings and conditions of living.

Minister's Reply

Mr. ERNEST BROWN said that the House would shortly have a debate on the health of the nation, so he would not say much about one or two general questions which had been raised. What was wanted in the health field was a positive policy, and that was the desire of the Government. In his original statement he did not use the term "region," but a wider term, not because he was against regions but because it was clear that in recent months the word "region" had become, both in civil defence and in local authority affairs, connected with things which were sometimes very debatable and likely to arouse strong feeling. The first thing to do was to survey the areas concerned, to assemble the facts, and then, on the basis of those facts, to enter into discussions which would beat out the actual framework and the substance, with regard to both method and finance. It was clear, if we were to have a hospital service for the nation, that we had to work to a true partnership between local authority and voluntary hospitals.

There were still beds in the periphery of London, but all the time in war we had to be prepared for many kinds of eventualities. During his 14 months of office he had increased the number of categories for which the Emergency Hospital Scheme was available. If, in the months ahead, experience enabled him to go further than that he would have no hesitation in doing so. We needed more beds for the treatment of tuberculosis. He had already made more available inside the Emergency Hospital Service, but the difficulty was not so much on the side of beds as of staff, both nursing and domestic. The Department had for some time been doing its utmost to get more staff. He would not enter into a general argument on mass radiology, but would reserve a full statement about tuberculosis for the debate on the health of the nation. The Department, however, had taken steps to order a number of machines from America, and, in addition, specifications had been drawn up for the manufacture of similar machines in this country.

E.M.S. after the War

He would take care to see that the Emergency Hospital Scheme was not destroyed in the post-war world; it would be fitted into the general scheme. Certain things about the Emergency Hospital Service contained great lessons for the future—such as the grouping of special treatment centres; the elimination of unnecessary and uneconomical competition in some specialized fields by adjacent hospitals; the correlation of hospitals by a wider conception of hospital service; the dispersal arrangements; the convalescent auxiliary hospitals in country surroundings, with medical supervision and reasonable nursing standards; and inexpensive hospital construction. We must also learn how to use in peacetime, at the centre and in the local centres, the consultant advisory idea, so as to get pooling of the best surgical knowledge and experience.

The "Region" and Local Authorities

The motion moved that day referred to the need for regional planning of hospital services, and ended with a plea for discouraging independent schemes for the future building of hospitals as being inimical to a proper co-ordinated post-war plan. Both these matters were of the very essence of the Government's policy. His original statement had made it clear that to achieve the best results and avoid a wasteful multiplication of accommodation and equipment it would be necessary to design a hospital service in areas substantially larger than those of individual local authorities. They also aimed at avoiding overlapping and uneconomical expenditure by securing the provision of highly specialized services at teaching hospitals and other centres chosen to serve these wider areas, and by arranging for a proper division of functions between the hospitals in those areas. It was clear that the existing hospital system in the county boroughs, with the exception of a few of the largest towns, could not provide the enlarged and full facilities in the way of hospital treatment which modern science had put at our disposal, and that any attempt to provide these, town by town, would be grossly uneconomical. The same was more true of most counties. In planning the lay-out of hospitals we must accordingly look to wider areas, and proceed on the footing that all future accommodation provided, whether by municipal or voluntary effort, might form part of a new public health hospital service and be in accordance with the general design, and not haphazard.

The Government agreed that the utmost efficiency with maintenance of democratic control could only be secured by full recognition of the status and responsibilities of local authorities. In discharging their new and important duties these authorities would naturally and rightly look to the assistance of the voluntary hospitals, whose experience was so extensive and valuable. The Government envisaged the continuance of a more ordered and regular partnership of the voluntary and municipal hospitals, which had in fact secured the hospital provision of the country for many years past. The conception of this partnership remained a keystone of their policy.

The survey of hospitals in London and the surrounding area which he had instituted was well under way. He had been fortunate to secure for this work the services of a well-known medical man in consultant practice, and a not less distinguished officer in the public health service. In the result he felt confident that there would be a large mass of valuable information as to the accommodation, equipment, and staff of each hospital in this area and the localities from which it drew its patients. We should then know the needs and the possibilities for the future. He had recently received requests from bodies representing the municipal and voluntary hospitals in Lancashire, Cheshire, and North Wales for a similar survey. He proposed to institute in the near future a survey which would cover the territory centred on the teaching hospitals of Liverpool on the one hand, and Manchester on the other. This survey also would be primarily an investigation of facts by skilled men fully competent to advise him on the conclusions to be drawn from the facts. The fact that these and other areas were surveyed as a whole would in no sense prejudice the question of future areas, and most of all the question whether the territory should ultimately form one or more areas for hospital purposes.

In conclusion Mr. Brown referred to the preliminary discussions which had taken place between the Ministry of Health, representatives of hospital authorities, and the London County Council. In the hope that these would assist in clearing up certain difficulties he had held his hand, because he desired to see the surveys pursued a bit further. He believed that then such discussions as took place would be more fruitful than would have been the case if he had made categorical decisions now, in advance of the assembly of the evidence.

The motion was withdrawn.

Yellow Fever Inoculation

On April 21 Sir JAMES GRIGG told Mr. Leach that when it was thought necessary British soldiers were inoculated with yellow fever vaccine. The vaccine consisted of attenuated living virus grown in chick embryo and dried *in vacuo*. Recent books on immunology gave details of the process.

Scabies

Mr. BROWN told Mr. Ammon on April 16 that the causes of the increase in scabies were not fully understood. Special wartime conditions undoubtedly conduced to the spread of the disease, but a steady increase in incidence was noted for some years before 1939. Research arranged over a year ago was being continued by the Medical Research Council. Curative and preventive measures based on this research would, he hoped, help to reduce the incidence. Local authorities, under an Order made in Oct. last, received additional powers, the object of which was to secure the early ascertainment and treatment of cases of scabies which would otherwise have gone undetected and would have acted as reservoirs for the parasite causing the disease.

Petrol Allowances

On April 21 Mr. LLOYD informed Sir J. Mellor that allowances of petrol to replace the basic ration after its abolition on July 1 were to be granted only to meet genuine need as distinct from convenience, and only where alternative transport facilities were not available or were markedly inadequate for the purpose in view having regard to the age and physical condition of the person making the journey. Subject to these conditions a supplementary allowance would be admissible in such cases as visits to hospitals and similar institutions for medical treatment.

Sale of Drugs in Chain Stores

On April 21 Major LYONS asked the Minister of Health whether, in view of the possible dangers to health resulting from the unrestricted sale of pre-packed drugs by chain stores and the like, he would institute an inquiry to ascertain the proportion of such drugs now sold to the public by persons without any pharmaceutical training or qualification. Miss HORSBRUGH replied that the Minister would not, on the information before him, be justified in instituting an inquiry. Major LYONS asked if the Department would go further into this matter, in the interests of the public health, to see what was really the position. Miss HORSBRUGH agreed to do this.

Population Statistics

In reply to Sir FRANCIS FREMANTLE, who asked for the crude birth and death rates for England and Wales for 1941, Mr. BROWN said they were 14.2 and 12.9 per 1,000 of the population respectively.

Sir FRANCIS FREMANTLE further asked what would be the estimated population of England and Wales in 40 years' and in 100 years' time if birth and death rates were to continue at present levels. Mr. BROWN said he would send Sir Francis a copy of a memorandum prepared by the Registrar-General's Department on the estimation of the future population of this country. He would consider the best way of making the memorandum generally available, as the subject was of great importance. The Minister also told Sir Francis that he was having an investigation made by the Registrar-General's Department on the net reproduction rate of women aged 15 to 50 years in this and some other chief countries.

Prevalence of Head Lice

In reply to Sir John Mellor, who asked whether the Minister of Health could give any statistics about the prevalence of head lice, and what steps he was taking to reduce this danger to public health, Miss HORSBRUGH stated that comprehensive statistics for the population at large were not available. With the help of the Central Council for Health Education propaganda to instil a sense of personal responsibility in this matter had been in progress for some time. Local authorities took every opportunity of discovering infestation among persons who came within their notice under various services, and provided facilities for their treatment. Their powers in this connexion had been extended by an Order which the Minister of Health made last October. Sir JOHN MELLOR asked Miss Horsbrugh if she would encourage medical officers of health to take more vigorous action. Miss HORSBRUGH said that some of them were taking very vigorous action, but she agreed that the notice of the public in general should be directed towards these matters.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* a large decrease in the incidence of scarlet fever, whooping-cough, and diphtheria was again recorded, the notifications being respectively 72%, 84%, and 82% of the total recorded a fortnight earlier. The notifications have risen in many individual counties, and the lower incidence is more marked in the North than in the South.

The 3,757 cases of measles were 483 in excess of the total of the preceding week, and nine counties contributed 80% of the total. The largest increase was in Lancashire—780 cases compared with 582 in the previous week. The chief centre of infection in this county was Manchester C.B.—233 cases, 104 more than in the preceding week.

In *Scotland* a decrease of over 25% occurred in the notifications of both measles and scarlet fever when compared with the preceding week. There was a small rise, 11 cases, in the incidence of diphtheria.

In *Eire* the figure for measles was the largest this year. Of the 158 cases, 82 were recorded in the City of Dublin, and 42 in the urban district of Athlone by Westmeath. One case of typhus was reported in the rural district of Shillelagh, Co. Wicklow, where 2 cases of typhus were reported a month ago.

Dysentery

Although the figure of 168 for dysentery was only 16 above the total for the preceding week in England and Wales, several areas showed a relatively large rise in incidence. The principal new local outbreaks were Cambridge (Chesterton R.D. 23); Essex (Brentwood U.D. 9), Leicestershire (Leicester C.B. 15); Surrey 25 (Coulsdon and Purley U.D. 10, Epsom and Ewell M.B. 15); Middlesex 20 (Southall M.B. 14). In Lancashire 16 cases were recorded in seven administrative areas. Only 4 cases were notified in Hertfordshire, where in the preceding week there was an outbreak of 42 cases.

In Scotland 95 cases of dysentery, 35 more than in the preceding week, were notified: 55 cases were reported from the City of Aberdeen.

Returns for the Week Ending April 18

The returns of the notifications of infectious diseases in England and Wales included the following: scarlet fever, 1,027; whooping-cough, 1,555; diphtheria, 786; measles, 4,087; acute pneumonia, 1,089; cerebrospinal fever, 158; dysentery, 208; paratyphoid, 8; typhoid, 11.

No. 14

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended April 11, 1942.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1942 (a)	1942 (b)	1942 (c)	1942 (d)	1942 (e)	1941 (Corresponding Week) (a)	1941 (Corresponding Week) (b)	1941 (Corresponding Week) (c)	1941 (Corresponding Week) (d)	1941 (Corresponding Week) (e)
Cerebrospinal fever	199	8	47	1	6	335	19	81	3	7
Deaths		1	3				2	2		
Diphtheria	736	37	210	35	17	939	48	245	20	31
Deaths	25	—	5	—	—	36	—	7	1	1
Dysentery	168	12	95	—	—	173	5	30	1	
Deaths		1		—	—			—	—	—
Encephalitis lethargica, acute	5	—	1		—	4	—	1	—	—
Deaths		1	—				—	—		
Enteric (typhoid and paratyphoid) fever						19	2	45	1	—
Deaths						1	—	—	—	—
Erysipelas		—	43	10	5			47	8	4
Deaths			—					—		
Infective enteritis or diarrhoea under 2 years				4						
Deaths	37	6	13	—	1	30	2	6	10	4
Measles	3,757	287	218	158	29	15,971	396	156		8
Deaths	3	—	2	1	1	24	1	2	—	—
Ophthalmia neonatorum	73	1	24	1	—	76	2	10	—	—
Deaths										
Paratyphoid fever	6	—	2							
Deaths	—	—	—		—					
Pneumonia, influenzal*	1,089	54	18	4	4	1,177	52	18	8	6
Deaths (from influenza)	33	2	3	—	1	70	3	7	3	7
Pneumonia, primary		43	320	23	12		35	436	15	7
Deaths				1					8	
Polio-encephalitis, acute	—	—				—	—			
Deaths		—					—			
Poliomyelitis, acute	2	1	—	—	—	—	—	3	—	—
Deaths		—					—	—		
Puerperal fever		1	13	1	—	1	1	21		
Deaths		—					—			
Puerperal pyrexia	187	13	18		—	111	5	10		1
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	939	45	157	56	31	1,137	67	131	39	31
Deaths	1	—	—	—	—	—	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever	3	—	5	6	2					
Deaths	—	—	1	—	—					
Typhus fever	—	—	—	1	—	—	—	—	2	—
Deaths	—	—		—	—			—	—	—
Whooping-cough	1,269	154	43	22	11	4,622	104	755		14
Deaths	14	2	—	—	—	36	1	22	—	—
Deaths (0–1 year)	370	41	78	34	25	414	19	133	33	25
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,796	680	733	248	125	5,207	620	859	211	191
Annual death rate (per 1,000 persons living)			16·5	16·6	†			18·7	14·0	16·7
Live births	5,731	589	924	336	230	4,890	372	924	366	254
Annual rate per 1,000 persons living			19·1	22·4	†			18·8	24·3	22·3
Stillbirths	253	24	34			207	11	37		
Rate per 1,000 total births (including stillborn)			35					39		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical News

Prof. J. C. Drummond, D.Sc., Scientific Adviser to the Ministry of Food, will read a paper on "Wartime Nutrition and its Lessons for the Future" at the Royal Society of Arts, John Adam Street, Adelphi, W.C., on Wednesday, May 6, at 1.45 p.m., with Lord Woolton in the chair.

The Royal Sanitary Institute will meet at Newcastle-upon-Tyne Town Hall on Saturday, May 9, at 11 a.m., to discuss "The Post-war Development of the Health Services," and at 2.30 p.m. a discussion on "The Scabies Order: Administrative and Practical Problems" will be opened by Dr. Ian McCracken.

The Labour Research Department is organizing jointly with the Socialist Medical Association a conference on "The Health of the War Worker," to be held at the Conway Hall, Red Lion Square, W.C., on Saturday, May 16, at 2.30 p.m. The discussion will be opened by Dr. T. O. Garland, and speakers from a variety of industries will give their experience. Among the subjects to be considered are special health dangers on wartime jobs, and the need for factory doctors and nurses in each key factory.

The Church Missionary Society will celebrate its Medical Mission Jubilee on Wednesday next, May 6, at 6.30 p.m. in the Kingsway Hall, W.C., under the chairmanship of the Bishop of Worcester, the speakers being Lady Willingdon, Dr. Elfrida Whidborne (Northern Sudan), and Dr. H. G. Anderson (C.M.S. Medical Superintendent). Admission is free by ticket; reserved seats 2s. Applications should be addressed to the Acting Superintendent (Tickets), Church Missionary Society, 6, Salisbury Square, E.C.4. A festival service will be held in St. Paul's Cathedral on Monday, May 4, at 5.30 p.m. (no tickets required).

The B.B.C. invites applications for the post of medical officer from those with public health or similar experience enabling them to advise the Corporation on all matters concerning the health, physical welfare, and conditions of service of staff throughout the country. The appointment is for the duration of the war, and the salary starts at £1,050 a year. Further information will be found in our advertisement pages.

The Board of Education has decided to set up a Child Care Division at Alexandra House, Kingsway, W.C.2, which will take over the work hitherto done by the Elementary and Medical Branches of the Board in connexion with wartime nurseries and other facilities for the children of women in employment.

Mr. Alexander Mitchell, Ch.M., consulting orthopaedic surgeon to the E.M.S. and the Army Medical Services, has been appointed a Justice of the Peace for the County of Aberdeen.

We are glad to be able to announce that Surg. Lieut. G. L. Ward, D.S.C., R.N.V.R., who was reported missing in our last issue at p. 540, is *not* missing. The announcement was based on official information which now proves to be inaccurate.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.
ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.
Authors desiring REPRINTS should communicate with the Secretary of the Journal Board, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.
ADVERTISEMENTS should be addressed to the Advertisement Manager (hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and subscriptions should be sent to the Secretary.
TELEPHONE NO.—B.M.A. and *B.M.J.*: EUSTON 2111.
TELEGRAPHIC ADDRESSES.—EDITOR, *Aitiology Westcent, London*; SECRETARY, *Medisecra Westcent, London*.
B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

QUERIES AND ANSWERS

Income Tax

Liability of Fellowship

K. C. holds a fellowship for one year's training and a grant to supplement it from one of the universities. Is it liable to income tax?

*** The relevant legal provision is Section 28 of the Finance Act of 1920, which excludes from liability income arising from a scholarship (including an exhibition, bursary, or other similar educational endowment) "held by a person receiving full-time instruction at a university, college, school, or other educational establishment." The terms of the section would not seem to include a fellowship which is held while the holder is doing professional work, even under some degree of trained supervision, as it contemplates whole-time study at an organized educational centre.

Earned Income in Eire

"Z" resigned an appointment in Dublin as from October, 1941, and accepted an appointment in the United Kingdom. How should his liability be assessed?

*** It is assumed that he has come to the United Kingdom for more than a temporary purpose, and ranks for the year 1941-2 as a resident both in Eire and in this country. In these circumstances he is chargeable both to Eire and to United Kingdom tax on the whole of his earnings for 1941-2, subject to reciprocal relief as a double resident. As he has not been charged to income tax in Eire on his United Kingdom earnings, the only relief he is entitled to here is in respect of the tax he has paid on his Eire earnings.

LETTERS, NOTES, ETC.

Treatment of Burns and Wounds by the Envelope Method

Mr. A. C. F. HALFORD (Brisbane) writes: Dr. D. O'Dwyer (Dec. 6, 1941, p. 836) seeks an answer from me at 15,000 miles when it is to be got in the "Address in Surgery" by Lister (*British Medical Journal*, 1871, **2**, 225), or in the *Collected Papers* (**2**, 172), wherein is written: "The weaker the antiseptic application, of whatever sort it is, the less irritation do we occasion to the tissues of the part treated with it. The antiseptic is always injurious in its own action; a necessary evil, incurred to attain a greater good." This injurious action may be inferred also from Lister's claim that "of all those who use antiseptics in surgery, I suspect I apply them least to the wound." With regard to newer antiseptics not available to Lister, continuous application causes the wound to grow protective granulations against the foreign reagent and pus forms, which, though it may be sterile, retards healing and reduces the natural inhibitory powers of the tissues and thereby enhances the chances of secondary infection, which no dressing to-day can prevent. We must admit that after the preliminary application of the "necessary evil" anything which we bring in contact with the surface of a wound is harmful, and so must avoid irrigation, packing, undue exposure, everything except another "necessary evil," some bland form of drainage material and then a dressing devised to exclude the irritating effects of the antiseptic it contains and any form of secondary infection. This kind of dressing is not for the wound, except in a protective way, but for the discharges from it wherein they are rendered innocuous and the spread of infection prevented.

"Prasso-therapy"

Dr. C. G. SCHURR (Hove) writes: The clumsy words "rehabilitation," "vocational," and "occupational therapy" are being used to an increasing extent. Has not the time come to give a proper name to this form of treatment? The word "prasso-therapy" is Greek in origin and states the nature of the treatment (πράσσω = I do, practise, occupy myself with). The third instead of the first person singular, "he practises," would possibly be more correct, but would make a word less easy to remember in view of the familiar "radio-" and "physio-therapy."

Two Rare Medical Books

Two of the rarest sixteenth century medical books in English are on sale at the moment in a single London bookshop (Messrs. Francis Edwards, Marylebone High Street). One is the earliest extant edition of Andrew Boorde's *Breuiary of Helthe*. "Imprynted at London in Flete-Strete at the sygne of the George next to Seynt Dunstane's churche by Wyllyam Myddleton," 1547; it is stated that there is no copy of this in the British Museum or any other known public library in the world. The other is the fifth (and best) edition of Thomas Raynalde's *Birth of Mankynde*, 1565, stated by Sir D'Arcy Power to be the most difficult issue of this obstetrical textbook to obtain. They are listed at £90 and £120 respectively.

Treatment of Scabies

Dr. R. PALMERSTON RUNDLE (Rockhampton, Queensland) writes: Your columns in 1941 have contained numerous letters, etc., on the treatment of scabies, but I have not noticed any reference to elegance of prescription or ease in treatment. Human nature only allows most people to do easy and pleasant things, and treatment with sulphur ointment makes an appalling mess of clothing, mattresses, etc., and is very distasteful to most, especially women. I have found the application of a 25% solution of sodium hyposulphite in water followed by 5% hydrochloric acid every night for three successive nights very effective in private practice. For those who do not mind an oily preparation, β-naphthol 10% in ol. gossyp. sem. is very successful and inexpensive.